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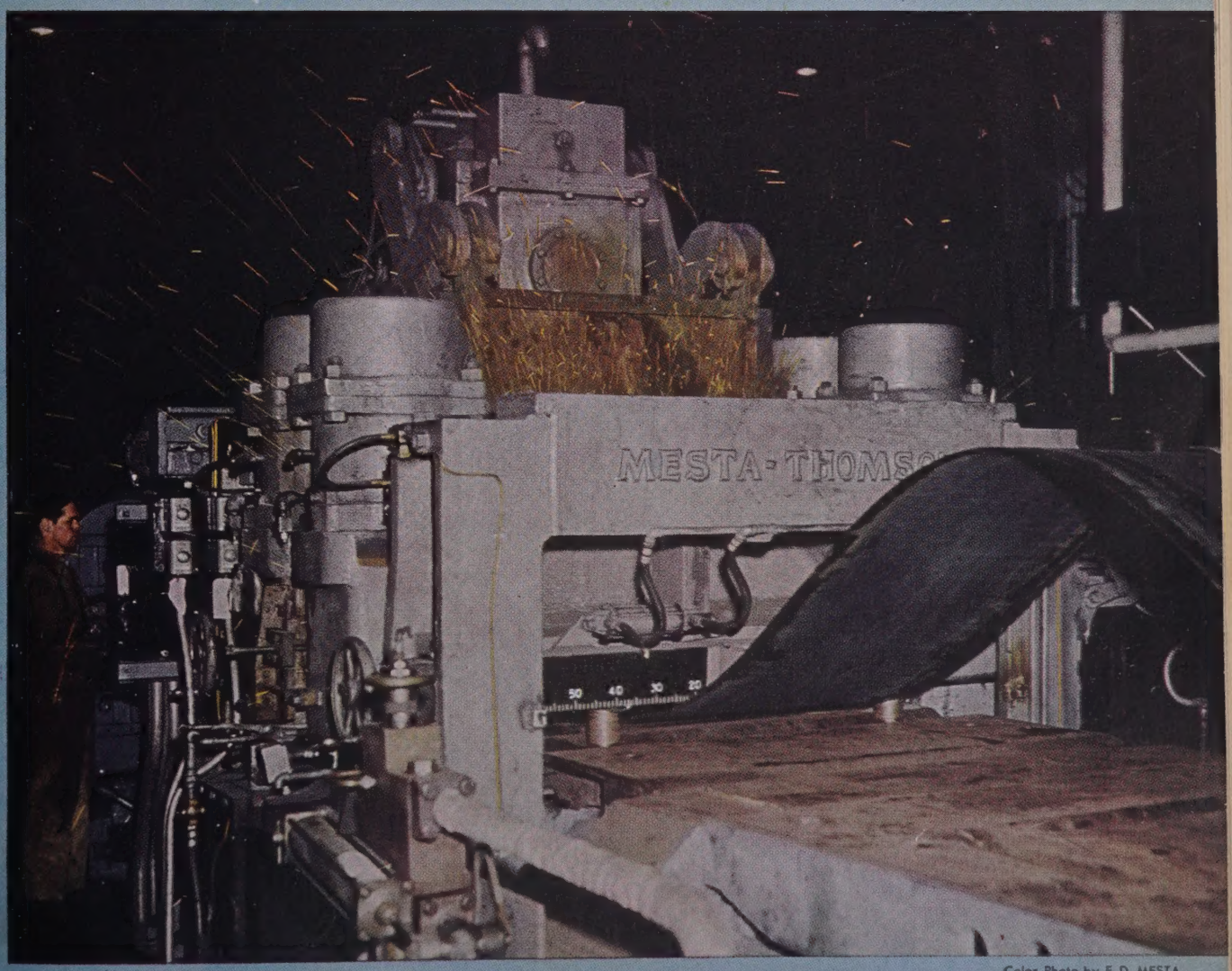
The
IRON AGE
MAY 27, 1948

Increase Cold Mill Production with
IESTA-THOMSON Flash Welders



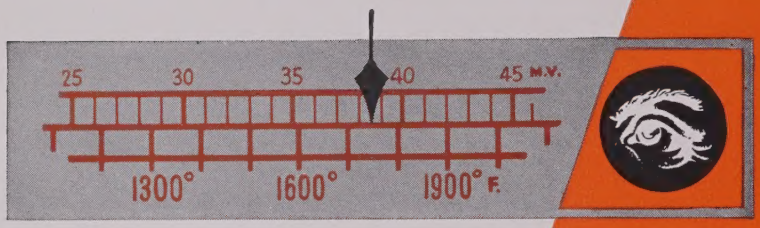
Color Photo by E. D. MESTA

42" Mesta-Thomson Flash Welder in a
Mesta High-Speed Continuous Pickling Line installed at
Jones & Laughlin Steel Corporation, Aliquippa Works.

MESTA MACHINE COMPANY . . . PITTSBURGH, PA.

DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

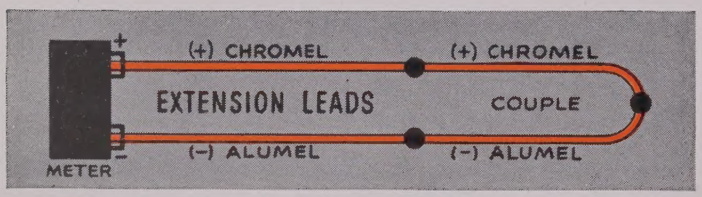
accuracy guaranteed...



when you use CHROMEL-ALUMEL®

"extension" leads with your

CHROMEL-ALUMEL thermocouples



Your pyrometers are probably accurate . . . most of them are today. And, too, most of them are calibrated for dependably accurate CHROMEL-ALUMEL thermocouples. But they can still register *inaccurate* temperature-E.M.F. values if you're using so-called "compensating" lead wires. Here's why . . .

When "compensating" leads are used, wires of different composition are joined together forming thermo-electric junctions just outside the furnace. When these junctions get hot . . . as they very often do . . . or when one gets hotter than the other, the opposing E.M.F.s they generate become more and more unequal . . . and serious plus or minus errors are registered by your meter.

So if you're concerned with accurate temperature measurement, make sure your pyrometers are calibrated for *and equipped with* durable CHROMEL-ALUMEL couples. Th carry a positive accuracy guarantee of ±5° betwe 32° and 660° F., and ± ¾% at temperatures above 660 And, of course, protect this fine accuracy by using o CHROMEL-ALUMEL *extension* leads. They belong toget . . . and together they eliminate all possibility of "cold-er errors! Our Catalog—58R contains complete technical inf mation . . . want a copy?

Additional References: Bureau of Standards Research Papers . . . R.P. 767—"Standard Tables for Chromel-Alumel Thermocouples". R.P. 768—"Methods of Testing Thermocouples". R.P. 1278—"Stability of Base Metal Thermocouples in Air at 800° to 2200° F."

Chromel® nickel-chromium wire

HOSKINS MANUFACTURING COMPAN

4445 LAWTON AVE. • DETROIT 8, MICHIGAN

Heating Element Alloys ★ Heat Resistant Alloys ★ Thermocouple Alloys ★ Spark Plug Electrode Wire ★ Special Alloys of Nickel ★ Electric Heat Treating and Laboratory Furnaces

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If you use steel or steel products, we're going your way. Do you have a tough forging problem? Are you looking for a supply source for an intricate stamping? Do you have exacting specifications for a special casting? Do you need assistance on a problem in steel fabrication?

The cumulative skill of all Barium personnel is brought to bear upon your problems when you buy Barium products.

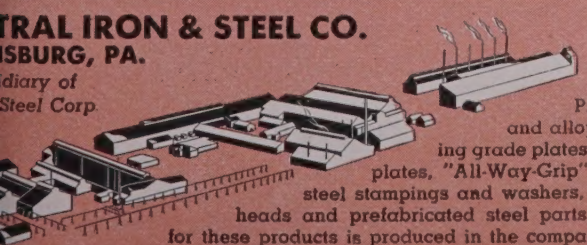
We are a corporate neighborhood with a common interest in steel . . . all working together to produce the best possible steel and steel products for you.

Get acquainted with the Barium subsidiary which can best advise you on your problems and supply your needs.

WE MELT, ROLL, CAST, FORGE, STAMP, MACHINE AND FABRICATE STEEL

OF THE 16 BARIUM GOOD NEIGHBORS

TRAL IRON & STEEL CO.
ISBURG, PA.
diary of
Steel Corp.



Producers of carbon and alloy steel plates, forging grade plates, boiler and fire-box plates, "All-Way-Grip" steel floor plates, steel stampings and washers, flange and dished heads and prefabricated steel parts. High-grade steel for these products is produced in the company's own furnaces

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STEELWRIGHT TO THE NATION

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BARIUM STEEL & FORGE, INC., *Canton, Ohio* • **BARIUM EQUIPMENT CORP., BARIUM STEEL EXPORT, INC.** • **BAYONNE BOLT CORP.**, *Bayonne, N. J.*
THE CUYAHOGA SPRING COMPANY, *Cleveland, Ohio* • **THE GEOMETRIC STAMPING COMPANY**, *Cleveland, Ohio* • **PERMA-JACK CORP.**, *Cleveland, Ohio*
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to reduce time... expense...tool wear

The free-machining characteristics of Holliday Speed Treat plate saved considerable time and money on this heavy machining job. Made by the Rheem Manufacturing Company, Stockton, Calif., this back-up plate for a boiler inspection press was machined from 3½" Speed Treat plate. Work included step machining, drilling of eighty-eight 25/32" holes . . . and the drilling and tapping of sixteen ⅝" holes. When you have a similar job . . . savings of better than 35% in machining costs can be effected through the use of Holliday Speed Treat (.45% carbon) or Speed Case (.20% carbon) Steel Plate.

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Speed Case - Speed Treat Plate Division

HAMMOND INDIANA

Plants at Hammond and Indianapolis

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SPEED CASE
Low Carbon
SPEED TREAT
Medium Carbon
Open Hearth • Free Machining
STEEL PLATES

W. J. HOLLIDAY & CO. 92 1856 YEARS of STEEL 1948

Fatigue Cracks

BY C. T. POST

Our Own Mail Box

• • From Jerry Lee, Plainfield, N. J.:

"As a constant reader of your f.f.j. I would like to offer the following recipe for squirrel stew you ask for in the May 6 issue: (1) Catch squirrel, preferably by stunning by barking with a marble from sling shot and finishing off by drowning in Scotch, about '15. (2) Skin by splitting hide midway across back. Remove by inserting first two fingers of each hand in slit and pulling apart. As skin comes off over head, cut ears off close to skull and cut tendons at corner of mouth, as this lets whiskers and nose come off with the hide. Leave head on carcass —this is the best part. Cut off tail and feet, remove entrails and wash in cold water. (3) Place in covered stew pan with plenty of H_2O and boil like h--l or until you can get a fork into the broth (city squirrels are always tough whether grey or gray, but don't mind that). (4) Add vegetables and strips of hard dough (1 cup boiling water to 1 cup white flour, rolled to 0.125 in. thick), season with salt and pepper, add dash of bourbon just before serving. (Note: Two squirrels will serve four guys if they can stand it.) (5) Throw the nasty mesh away if your better half hasn't already.

Sounds fit for a king, Jerry. For the first course, we'll have brandied catfish a la f.f.j. since the better half frowns on cocktails: Bake catfish for two hours in medium oven, immerse and chill in Napoleon brandy or reasonable facsimile, setting refrigerator to lowest cooling rate Remove and discard catfish, drink the brandy. Serves 6.

W. Blair Hartley, The Perfect Circle Co., Hagerstown, Ind., takes issue with our description of Winston Churchill's king-size cigar as an index of prosperity in Great Britain. We mentioned that Winnie held the Corona Corona Corona between his *fore-* and *index* fingers. "Aren't they the same?", asks Mr. Hartley. In the United States, yes. In Great Britain, we understand that Mr. Churchill used to get top-secret international conferences off to a flying start by suggesting four fingers of Scotch all around. Each of the other delegates, realizing the necessity of clear thinking, poured only a forefinger for himself as the bottle was passed the first time. This created a diplomatic precedent which the Prime Minister could not ignore entirely, but when the bottle came to him he used the largest finger of the hand, rather than the one nearest the thumb for measuring, placing it on the glass vertically. Thus, the great statesman achieved his original purpose without offending anyone. In tribute to this sheer genius, the middle finger is now referred to as the four-finger in diplomatic circles.

Peirce Lewis, who doubles the business of Detroit's industrial giants by allowing them to advertise in your f.f.j., took time off from his literary research to send the following from the *Saturday Review of Literature:*

"In Philadelphia, the wife of a striking compositor helped balance the family budget by taking a job in a laundry—she ironed while the strike was hot."

That, Peirce, makes the title "Iron Age" all the more appropriate, for the Philadelphia compositors who used to set type for f.f.j. have been absent from their customary stands for some weeks.

The Name Fits

• • The principal speaker at a conference on adult delinquency in Los Angeles, advises R. Raymond Kay, was Dr. Walter C. Reckless of Ohio State University. Our joy in receiving this aptronym was shattered by Mr. Kay's pencilled notation, "Catch on?". Come, Mr. Kay, is that quip necessary?

Stanley J. Smith, a mighty man in Chicago advertising circles, asks us to chew over the fact that an elevator operator in the Wrigley Building is named Armin Hand. Not an aptronym, Mr. Smith. We're still looking for the elevator jockey named Upson Downs.

Money Man

• • A demonstrator of industrial vacuum cleaners at the Invincible Vacuum Cleaner Manufacturing Co. booth was cleaning up cash. He'd toss a few hundred pennies on the floor, then run the vacuum cleaner over them. If the foundries really want to attract labor, they might whisper it around that this was standard foundry practice.

OR CADMIUM PLATING
Cadmium Anodes
Udylite Salt No. 1
Udylite Salt No. 2
Udybrite

OR CHROMIUM PLATING
Lead Alloy Anodes
Chromic Acid

OR COPPER PLATING
Copper Anodes
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OR NICKEL PLATING
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Bright Nickel
Nickel Salts
Nickel Carbonate
Nickel Chloride
Boric Acid

OR SILVER PLATING
Silver Anodes
Silver Cyanide

OR TIN PLATING
Tin Anodes
Sodium Stannate
Sodium Acetate

OR ZINC PLATING
Zinc Anodes
Bright Zinc
Zinc Oxide
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JUST NAME WHAT YOU NEED! HERE'S . . .

Everything from Anodes to Zinc salts

IN PLATING AND POLISHING SUPPLIES

Here—under one roof—is everything you need for modern, high-efficiency plating and polishing operations. *And that spells real convenience for you!* It saves your time, it simplifies your records, and means speedier service when you make a habit of ordering all your plating supplies from Udylite Corporation. All Udylite supplies are laboratory-tested to assure maximum serviceability and efficiency . . . *with satisfaction guaranteed.*

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IMPROVED EFFICIENCY

WITH

RUTHMAN GUSHER

COOLANT PUMPS

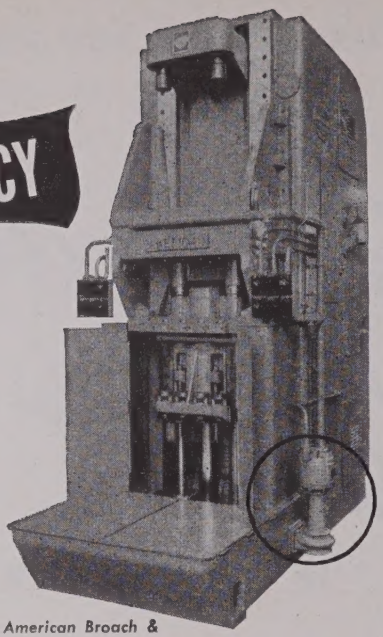


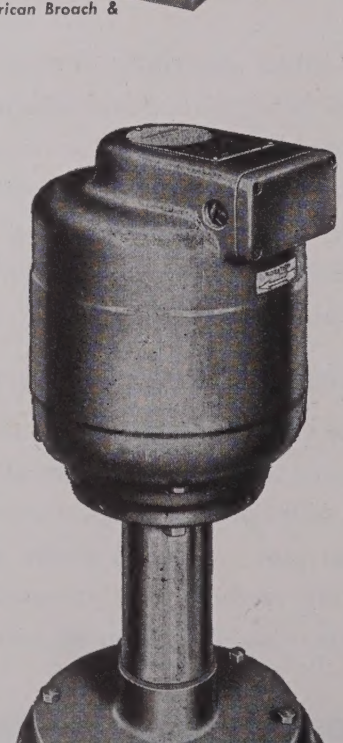
Photo courtesy American Broach & Machine Co.

For improved efficiency in your metal cutting operations specify Ruthman Gusher Coolant Pumps.

Oversized pre-lubricated bearings reduce maintenance cost. Electronically balanced rotating parts assure quiet operation and longer life. Split-second control of coolants, from a trickle to full volume, gives coolant flow where you want it when you want it.

Illustrated is an American VP-5-25-40 Broaching Machine equipped with a Model 11022-C ½ HP Gusher Coolant Pump.

Write now for Catalog 10-B



THE RUTHMAN MACHINERY CO.

1821 READING ROAD CINCINNATI 2, OHIO

Dear Editor:

CEILING PRICES FOR STEEL

Sir:

I believe that IRON AGE can a should do a real service for t country by putting pressure on t 80th Congress to apply ceiling pric to sheet steel. We, and other co panies, are desperately in need sheets. The U. S. Steel Corp., J T. Ryerson & Son and other legi mate suppliers have none availab but during the past week we ha had over 1000 tons of prime mat rial offered us for about 15¢ a instead of the legitimate price roughly 5¢. Letters offering su material come to us every day.

If the word went out from IR AGE and daily papers and from r sponsible leaders in Washingt that a bill was being prepared put a ceiling of not over 6¢ on she steel effective as of May 15 or Ju 1, these black market dealers wo start unloading quickly and so steel would be again flowi through legitimate channels legitimate prices.

This is a job for you and I ho that you can get busy right aw

CHARLES S. SMIT
Pierce Engineering Co.
Olean, N. Y.

SHOE SHINE MACHINE

Sir:

In the March 18 issue there a peared a photo of a coin operat shoeshining machine. We are terested in learning more ab this item and would appreci your forwarding the name and a dress of the manufacturer.

A. J. LIEBMA
Research Engi
Dravo Corp.
Pittsburgh

• **Kinmont Mfg. Co., Inc., 5555 E. Slau Ave., Los Angeles is the manufacturer.—**

CARBIDE CUTTERS

Sir:

We would appreciate it if y would forward 24 copies of "H to Use Carbide Cutters for Millin If there are any charges we forward our check by return m

J. M. ROBERTSO
Pratt & Whitney of Canada
Dunday, Ontario

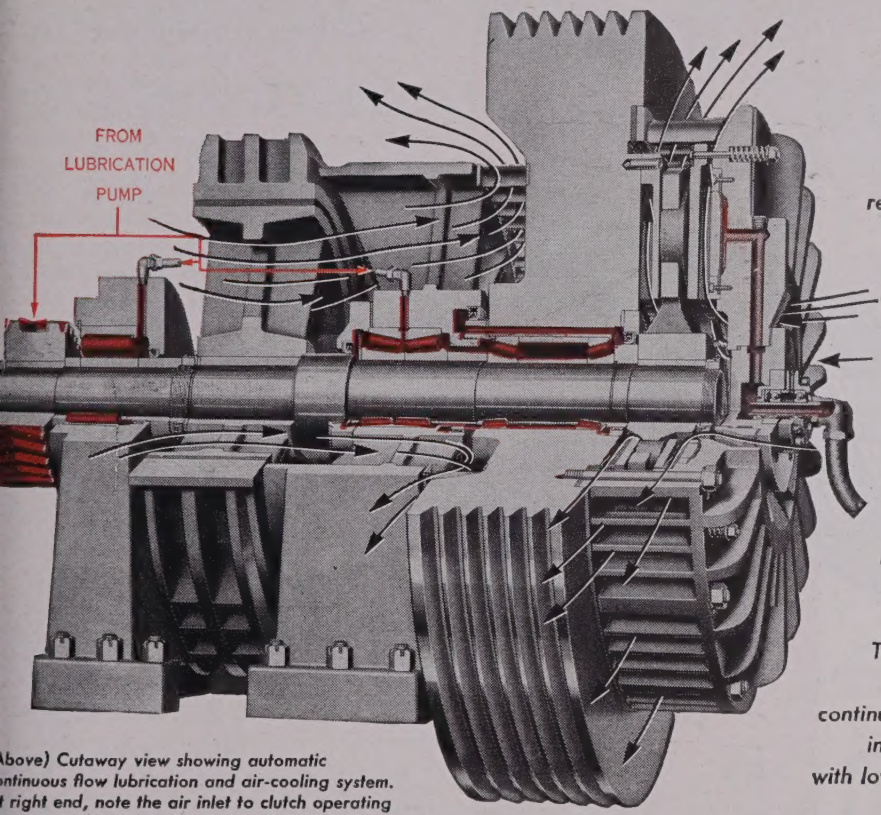
• **Charges on the booklet are $1.00 e Your order has been mailed.—Ed.**

HEAT RESISTANT ALLOYS

Sir:

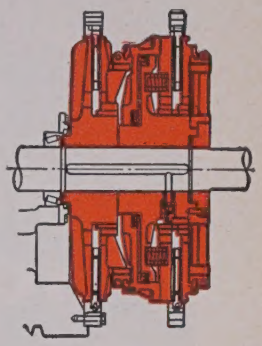
The series of articles, "A Su mary of Heat Resistant Alloy

PRESS CLUTCH ENGAGEMENTS
. *under load* with negligible wear



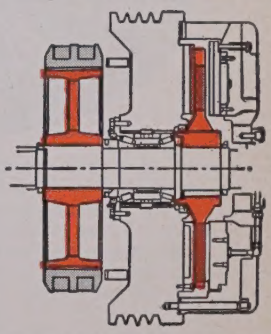
(Above) Cutaway view showing automatic continuous flow lubrication and air-cooling system. At right end, note the air inlet to clutch operating diaphragm. Multiple friction discs float in clutch spider when disengaged. Brake shoes in drum at left are spring-engaged and air-released automatically.

Cross sectional outline of conventional clutch shows relative proportion of components subject to acceleration (indicated in red).



conventional type press clutch

Note the smaller mass of accelerated components in the Danly Clutch. The larger mass (not shown in color) in continuous rotation results in easier acceleration with lower starting torque.



new Ventilated Danly Clutch

Danly Press and Clutch Features Reduce Press Down-Time

Construction features of the Danly Clutch offer specific reasons why Danly Presses cost less to operate and produce more stampings over a given period.

Long Life of Friction Discs is assured because of the low starting torque of Danly Clutches. Low-energy clutching characteristics have been achieved by a new design which requires less than one-fifth the mass in clutch components subject to acceleration, as compared to conventional press clutches.

Cool Operation further reduces wear of friction discs and provides protection of the antifriction bearings from overheating. The clutch housing itself is a cooling fan which provides high velocity ventilation through internal ports adjacent to areas where heat is generated.

★ **Automatic Pressure Lubrication** circulates clean, filtered oil to each bearing *including the flywheel bearings.* There are no grease fittings requiring periodic attention of the operator.

★ **Instant Pushbutton Activation** is produced by compressed air controlled by an electric solenoid valve.

★ **Simple Disassembly** permits inspection of parts subject to wear. This can be done in only a few minutes. It is unnecessary to dismantle entire clutch to make infrequent replacements of worn parts.

DANLY MACHINE SPECIALTIES, INC.

2100 SOUTH 52ND AVENUE, CHICAGO 50, ILLINOIS

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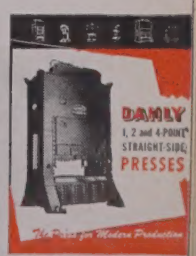
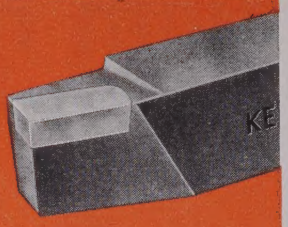
Write TODAY for valuable literature illustrating and explaining features of and suggesting profitable uses for Danly Presses. Standard Press Models available from 50 to 1,500 tons.

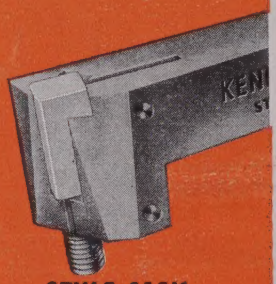


6 WAYS TO SAVE by using KENNAMETAL TOOLING to Increase Output of Metal Cutting Machines

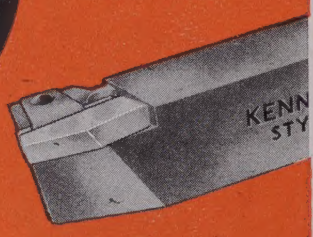
Typical KENNAMETAL TOOLS



STYLE BR



STYLE 11SK



STYLE 11H

STYLE SVG

Tool Blanks
Hundreds of sizes
in all popular grades

Your machines are only as efficient as the cutting tools you use. It's good, sound judgment to invest a few extra pennies in long-lived Kennametal tools that can turn out up to five times as much as high speed steel tools on the same machine in the same time. Here's what you can gain by using Kennametal tools:

—MACHINE TOUGHER, HARDER METALS
Steel-cutting Kennametal tools cut steels in the hardened state; often eliminate need for annealing and rehardening.

—INCREASE CUTTING SPEEDS UP TO 1000%
Kennametal lets you convert electric power into cuttings or chips in the least possible time.

—REDUCE MACHINE DOWN TIME
Kennametal cuts within tolerance from 5 to 20 times longer; reduces machine down time required to change tools.

—LOWER TOOL COSTS
Durable Kennametal is the lowest-priced tool material when cost is measured in pieces per grind and pieces per tool.

—MINIMIZE GRINDING
Kennametal wears longer; requires fewer trips to grinding room for sharpening. New mechanically-held tools simplify procedure—no steel to grind.

Kennametal is made in various steel-cutting grades, each containing $WTiC_2$—the distinctive ingredient that prevents excessive cratering which destroys ordinary tools; and in two cast-iron cutting grades—K6 for heavier, roughing cuts, and K8 for fine finishing and boring.

Ask our field representative to suggest the best Kennametal tooling—the right grade, the right tool—for each of your jobs.

KENNAMETAL Inc.
Latrobe, Pa.

Manufacturers of Superior Cemented Carbides and Cutting Tools That Increase Production

published in your March 18, April 8 and April 15 issues is of great interest to us. We would like to obtain two reprints of this paper if possible.

A. M. TALBOT
International Nickel Co.
Bayonne, N. J.

DIECASTING MACHINES

Sir:

In the March 25th issue there was an article on a 1000-ton diecasting machine made by Hydro-Press. The article stated that there are other machines of this size in this country, but that they are not now being used. To whom should we write regarding purchase of same. I would like the specifications of these machines, their condition, price and whether or not they are now available.

W. C. LEA
Lea Products
Los Angeles

• **Mr. Johnson of Standard Die Casting Co., Detroit will send you the information requested.—Ed.**

LABORATORY INSTRUMENTS

Sir:

In your May 1, 1947 issue, you published an article entitled, "Basic Characteristics of Useful Industrial Laboratory Instruments." I would like to receive about 25 copies of this if you are in a position to supply them.

J. F. BRETT
Babcock & Wilcox Tube Co.
Beaver Falls, Pa.

• **A single copy of this back issue is all we are able to furnish. The article can be photostated.—Ed.**

BACK COPY SOURCE

Sir:

I have a number of copies of THE IRON AGE through 1938, 1939 and 1940 which I will be glad to pass on to anyone wishing to complete their files.

PETER ZASADNY
Oak Park, Ill.

DIE MATERIALS

Sir:

We are very much interested in securing a copy of the article entitled "New Developments in Die Materials" which appeared in your Oct. 12, 1944 issue.

R. E. VANDER MAAS
Process Development Section
General Motors Corp.
Detroit

• **Tearsheets have been sent.—Ed.**

McCARROLL TRIBUTE

Sir:

I wish to compliment you on your article paying tribute to Mr. R. H. McCarroll. His death was

ELECTRIC LIFTING IS *LOW-COST* LIFTING

The WHITING Electric Hoist is *13 Times as Fast* as a Hand Hoist.....

You can speed up your materials handling and cut idle time with Whiting electric hoists. These powerful little hoists will handle heavy loads 13 times as fast as a hand hoist. By releasing men and machines for productive work, these hoists will pay for themselves in a very few months.

The unique worm-gear drive of the Whiting hoist means simpler construction, fewer parts, and greater compactness. The hoist is steel from hook to hook—the load is entirely supported by shock-resisting steel, for the utmost in strength and safety. A single-bar grip provides easy one-hand control, freeing the other hand for steadying the load.

Another feature of the Whiting hoist is its dual-voltage motor. By a simple change in internal connections, the motor can be quickly converted from 220 to 440 volts or vice versa. A ½-ton Whiting hoist is also available with a single-phase motor, for operation on 110-volt, 60-cycle current.

To install a Whiting hoist, simply hang it up, plug it into the nearest electrical outlet, and it's ready to go. The hoist is so light in weight that one man can install it alone, yet it has the ruggedness to stand up under heavy duty.

Yet the One-Ton Size Costs Only

$230.00
F. O. B. HARVEY, ILLINOIS

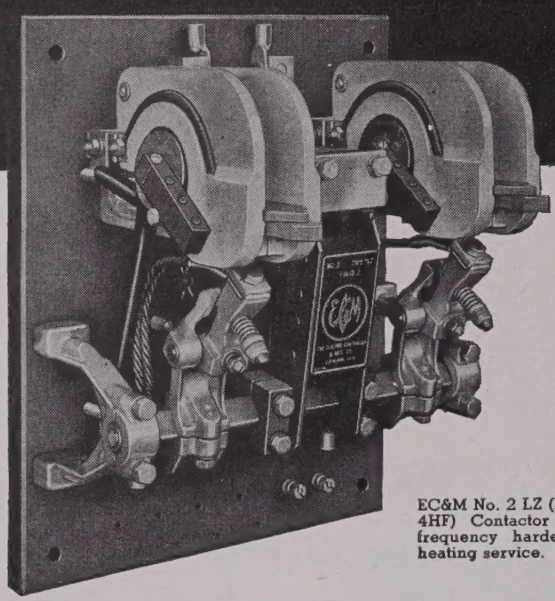
If it Saves One Man Only 12 Minutes a Day IT PAYS A PROFIT!

Write for Bulletin H-100A

WHITING CORPORATION
15601 Lathrop Avenue, Harvey, Illinois

WHITING
ELECTRIC HOISTS
¼, ½, and 1-Ton

AND NOW...A New Line of High Frequency Contactors



EC&M No. 2 LZ (NEMA No. 4HF) Contactor for high-frequency hardening and heating service.

DEVELOPED specifically for closing and opening the high frequency power circuits in heat treating and hardening applications—on frequencies up to 10,000 cycles per second.

Known as the Type LZ of *LINE-ARC* Design, these EC&M contactors are of double-pole construction, using one pole to open each side of the line. Their blow-out coils are not subject to excessive heating from eddy currents, but are introduced in the circuit at the time the contactor starts to open to interrupt the flow of current.

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Ask for Bulletin 1215 which gives sizes, ratings, and dimensions of these outstanding new contactors. If you have a specific problem please advise (1) frequency (2) control voltage and (3) ampere capacity so that we can write you fully.

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Marcinelle-Charleroy, Belgium

• List of ship builders has been mailed.—Ed.

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A. S. FRIEDMAN
Engineering Laboratory
Ford Motor Co.
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ROBERT A. WILLEY
Metallurgist
Commercial Steel Casting Co.
Marion, Ohio

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General Manager

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Sir:

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Sir:

We will appreciate it if you wi send us pages 170-174, 219-20, of th Sept. 11, 1947 issue. . .

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Vice-Preside

James Mfg. Co.
Fort Atkinson, Wis.

• **Tear sheets of the article, "The Taft-Ha ley Act—What it does do—What it does n do" by Robert A. Taft are being sent.—Ed.**

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Sir:

We desire a reprint of the artic on spark testing which appeared i the July 18, 1946 issue.

E. ENTERS
Chief Inspect

Line Material Co.
Milwaukee

• **Tear sheets of "Training Spark Tester are being forwarded.—Ed.**

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Sir:

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J. V. BERTRAND
Direct

Loewy Research & Development
New York

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Sir:

We would like to obtain a copy an article by C. J. Lewis entitle "Lime Treatment of Waste Pick Liquor," which appeared in th June 26, 1947 issue.

EARL SOUKUP

Detroit Tube & Steel Co.
Detroit

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Beyond Their Means

THE tumult and the shouting have subsided. This country has set aside six billions to tide Europe over another year. Yet it is already urged - particularly on behalf of England - that this cannot cure her dollar deficiency. It is hinted that the scale of aid is inadequate, that a year's succor cannot do the trick, that western Europe may become a permanent pensioner of the United States.

This will not be an easy burden for the American people to accept. No fine-spun rationalization of exchange deficiency can overcome the suspicion that there is "something rotten in the state" of ERP. In this the practical instincts of the American people may well prove a sounder guide to policy than the expositions of Ph.D.'s or the exhortations of diplomats.

In considering the chronic exchange difficulties of our friends, it may be well to bear in mind the origins of the problem. In all fairness we must admit that the war had something to do with it. Insofar as dollar deficiency is the result of English sacrifice in a common cause, there lies a valid claim to our sympathetic interest and generous help. A further valid claim may be admitted insofar as such help is an investment in common defense against a new foe.

Beyond this we run into exclusively English responsibility for the current exchange predicament. A country's currency becomes weak basically for one or both of two reasons: The government may be spending more than it collects in taxes, with the difference coming from the banking system in the form of inflationary credit. This expresses itself at home in higher prices, which is simply another way of saying that the pound is losing value. If this loss in purchasing power is greater than the loss sustained by the dollar, then a free market will register this greater deterioration in a lower pound - dollar exchange ratio.

Such relative deterioration is difficult to measure between one country with price controls and another with free markets, particularly if both governments collaborate in the maintenance of a fixed exchange rate. There is good reason to believe that the pound has retreated further in value from its prewar base than the dollar.

A second source of basic weakness is the balance of trade. If Britain persistently buys abroad more than it sells, the supply of sterling will consistently exceed the demand. English export production has not been able to match in value the imports deemed necessary to sustain the English economy.

In both instances, domestic inflation and a refractory import balance, the English have been living beyond their means. Either their productive efficiency must improve or they must lower their standards of living. The other alternative, permanent subsidy by this country, is hardly acceptable to a proud and energetic race.

Joseph Stagg Lawrence

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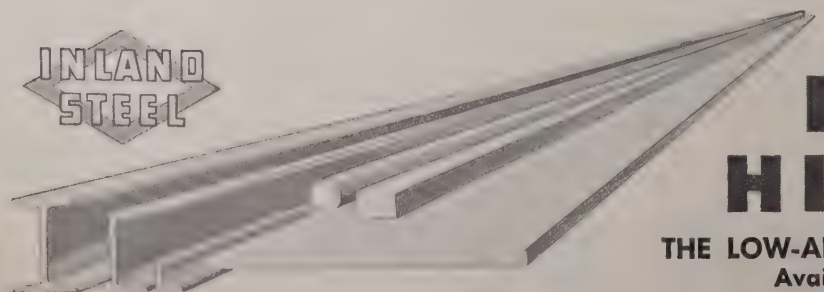

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► Washington economists are wondering if the world price slump now being predicted by some British industrialists is wishful thinking. Britain suffered heavily by price increases after its last loan and would like to see the tables reversed under ERP.

► By heating vaporized oil and passing a high voltage charge through it, one tin mill is able to coat an area of 2 million sq ft with 1 lb of oil. At least two other mills are using the same practice, although area coverage obtained by them is not positively known.

► The increase in union dues of steelworkers has already been interpreted in some quarters as a union declaration of intent for 1949. They point to Phil Murray's declaration that the extra funds might be necessary to maintain the workers who may be idle because of strikes. An opposite view may be obtained from Mr. Murray's assertion that a contractual commitment is a sacred obligation and that one must keep it. The major contract expires next Spring.

► British second-hand cars bring premium prices too. Recently 20 of them were brought up from the bottom of the Thames and sold for up to 75 pct more than they would have brought new. The cars, meant for export, were salvaged from the hold of a steamship which had been in a collision. The dealers who purchased them for amounts far in excess of list price expect to make a further profit on them.

► A 9 pct nickel alloy originally pushed for steel subject to very low temperature, has found its biggest application to date as tubing in deep wells where carbon dioxide type of corrosion is encountered. The use of this steel for low temperature work has yet to be decided.

► When do wasters become prime sheets? A Congressional investigating committee wants to know the answer. At least one major producer of steel sheets has been selling wasters at prices usually identified with prime sheets, according to Washington reports. Look for the company's explanation to come out in a Capitol Hill hearing.

► Recently displayed in Detroit was a standard make car equipped with all-aluminum trim, welded aluminum grille and aluminum bumpers. The aluminum is anodized to give added protection against corrosion.

► Seven-day melting and new equipment are cited as major reasons for continued improvement in British steel production, enabling the government to raise the target to 14½ million tons. Production is currently at a rate of more than 15 million tons annually, and consumer allocations have been increased. Those opposing nationalization of the industry believe these improvements show it is not needed, while those favoring nationalization point out that the impending legislation has caused producers to drive men and machinery to the utmost.

► As predicted, the steel capacity argument is up again. The industry's 5 million ton expansion plans are being called too small and some steel company economists are inclined to agree privately that more will be needed in the next 10 years. No one has figured out where the industry will get the money.

► A steel authority has been quoted as saying that using the best possible mill equipment the Russians were planning as recently as 1945 to use three times as many men to produce a ton of steel as is now required in this country.

► British makers of metal pre-fab houses are now studying the American market for this product. Their primary interest is to determine what adaptations are necessary to make their product suitable for sale in this country.

► Some steelmakers using new fast-charging electric furnaces are finding that their costs on low carbon and rimming steels are coming closer to openhearth costs where direct hot metal is not available for the openhearth. High raw material costs make comparison difficult now. But it is known that electric furnace sales and inquiries are substantially better though power shortages are holding up some business.

► Large steel buyers may soon find it advisable, in order to maintain their supply sources, to purchase more steel at locations closer to the mills. The latter, following present or potential law, and looking at rising freight absorption bills, may not be able to service even large customers at remote points.

Economy Factors in Carbide Milling

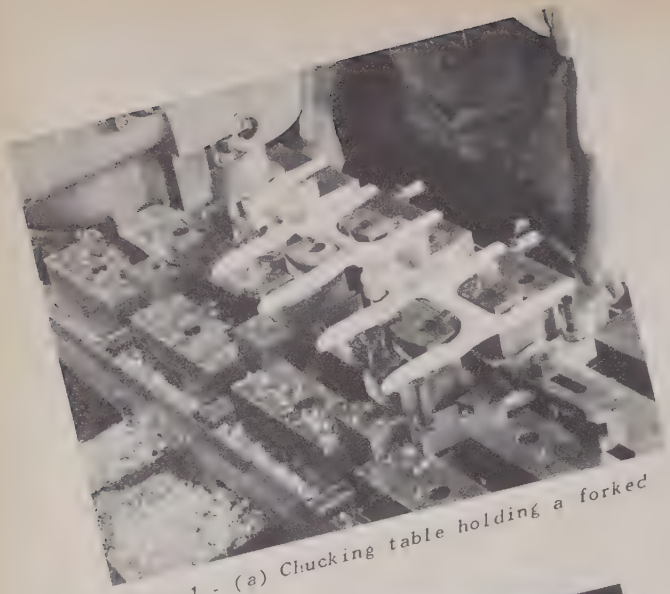
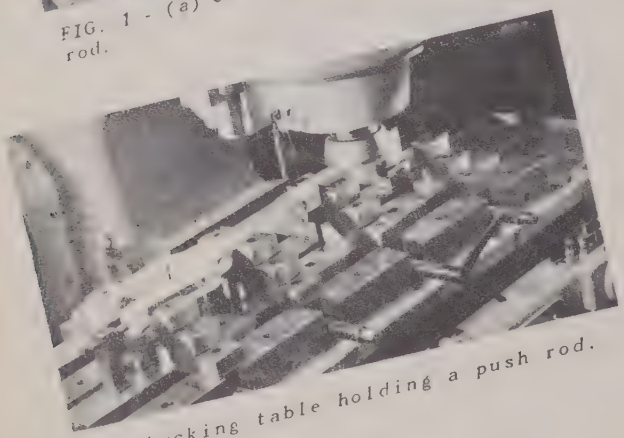
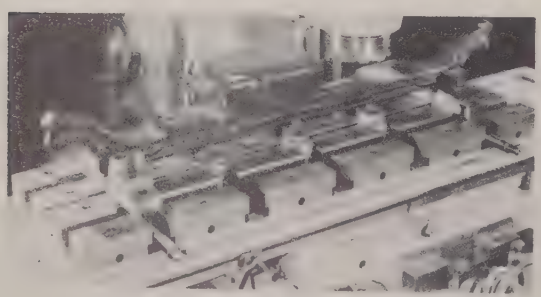


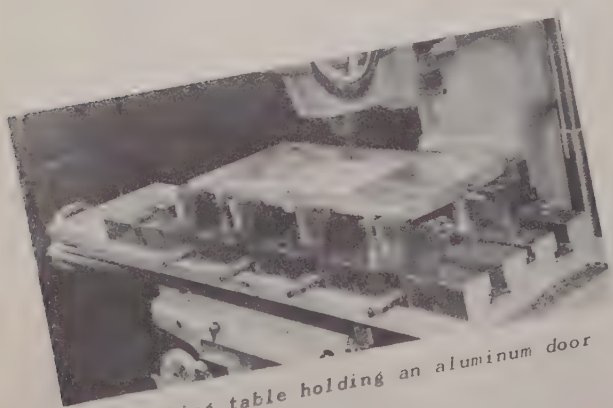
FIG. 1 - (a) Chucking table holding a forked rod.



(b) Chucking table holding a push rod.



(c) Chucking table holding a truck axle.



(d) Chucking table holding an aluminum door panel.

Experiments on cutting life of carbide tipped face mills focused the author's attention on many factors other than actual tool design that influence cutting tool life. The results of extensive tests on three types of carbide face mills, reported herein, stress the importance of such factors as work rigidity, cutter feeds and speeds, work piece hardness, carbide grade and machine load in improving cutting efficiency.

o o o

By A. O. SCHMIDT
Research Engineer,
Kearney & Trecker Corp., Milwaukee

o o o

THE technique of carbide milling, advanced and generalized during the war, is one of the most important aids in peacetime production. Yet, in high-speed milling with carbides there are many important factors, often overlooked or easily ignored, which can make or break a job.

Rigidity of an entire setup, especially in holding the workpiece, and reduction of loading and unloading time are important considerations which can be taken care of in the design of the holding device or fixture, assuming that a ma-

chine of sufficient capacity and in good condition is employed. Better cutter life, accuracy of work, and surface finish are obtainable if the work is held securely. However, workpieces that are not stiff by virture of their configuration or shape are difficult to hold properly with the vises and clamping arrangements ordinarily available unless fixtures are used.

Frequently, shops which do not produce parts in large lots cannot justify the expense of special fixtures which would otherwise be desirable. In such cases, a milling machine table specifically designed to permit rigid holding and quick handling of a great variety of shapes will prove profitable. Such tables, called chucking tables, are illustrated in fig. 1. Flexibility of setup is accomplished with a variety of interchangeable and reversible vise jaws.

The knee-type milling machine is a versatile production machine. An automatic table cycle mechanism which makes a knee-type machine more adaptable to volume production jobs is available. Although the machine can be fully manually operated, a predetermined automatic cycle assures uniform hourly production on both long and short runs. The entire operation is paced by the machines, but at the same time the operator is relieved of the necessity of many fatiguing motions, as illustrated in fig. 2. Both chucking table and automatic table cycle aid in reducing the total handling time per piece.

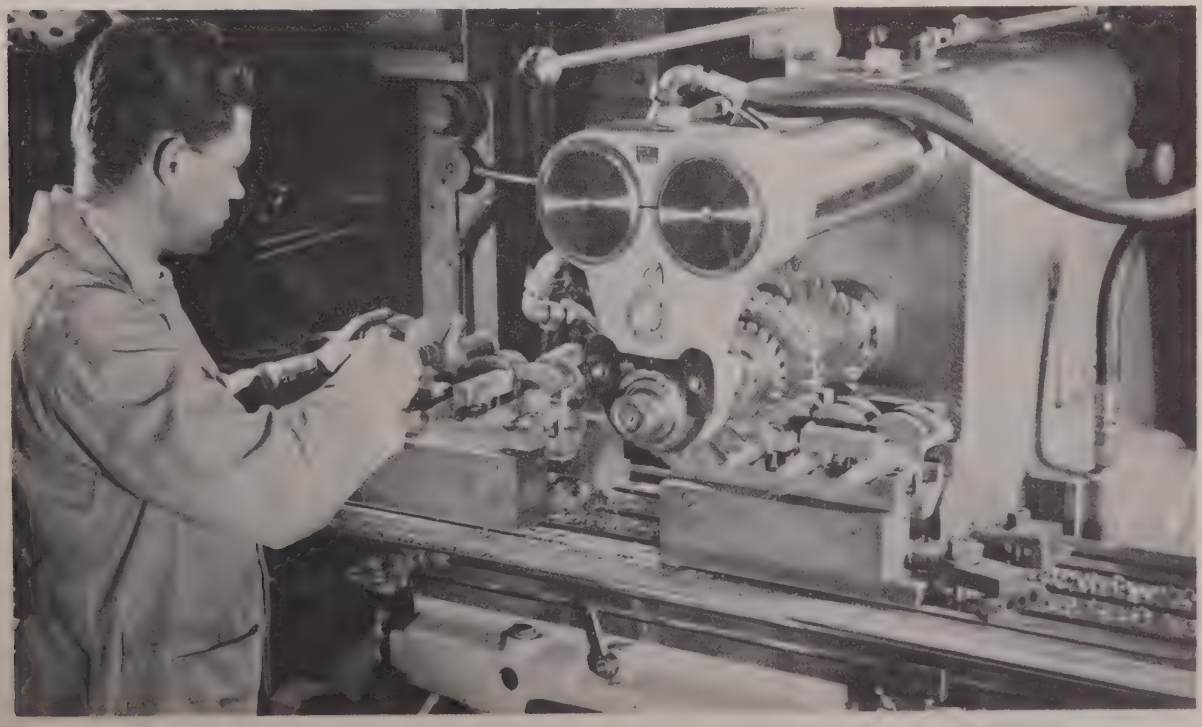
Because of the decrease in time per piece possible with carbide milling, cutters may wear out in a shorter time than would highspeed steel cutters although, of course, they will produce more pieces in that time. A question which naturally arises, therefore, is how many passes can be made with a carbide cutter. This question has been asked innumerable times and seldom can it be answered with a definite figure. It is especially difficult to answer when a particular kind of workpiece must be machined for the first time, or a new cutter design, a different tool material, machine tool or fixture has to be used.

Generally, after a number of trial runs the experienced shop man will be able to determine feeds and speeds which will permit near optimum production and also will be able to eliminate detrimental factors. This procedure will take varying amounts of time depending upon the conditions of the job. However, more or less constant improvement can usually be expected the more closely the job is attended. The following description of a particular milling operation in the shop serves to illustrate what can be done to improve performance after feeds and speeds have been settled upon. It also provides a typical answer to the question of how many passes a cutter can make.

A large steel block, fig. 3, annealed, 220 Bhn, was to be reduced in size. Ultimately, this required the removal of about 1½ tons of chips. A boring machine with a table large enough to accommodate this block and with a 15-hp spindle drive motor was selected. The cutters used were 8-in. CSM cutters with ten inserted solid carbide blades, similar to that shown in fig. 6. The width of cut of 3 in., depth of cut of 0.200 in., feed of 13 ipm, and cutting speed of 310 fpm required between 14.5 and 17.5 hp depending on cutter conditions. Shortly before the cutters were removed for regrinding they usually were drawing higher horsepower due to blade wear.

Fig. 4 graphically illustrates how the number of passes per cutter varied over a period of three days. The average for all six shifts was ten

FIG. 2 - Production capacity of this knee-type milling machine is greatly increased by automatic pacing of the milling operation and reduction of cutter idle time through the means of the automatic table cycle.



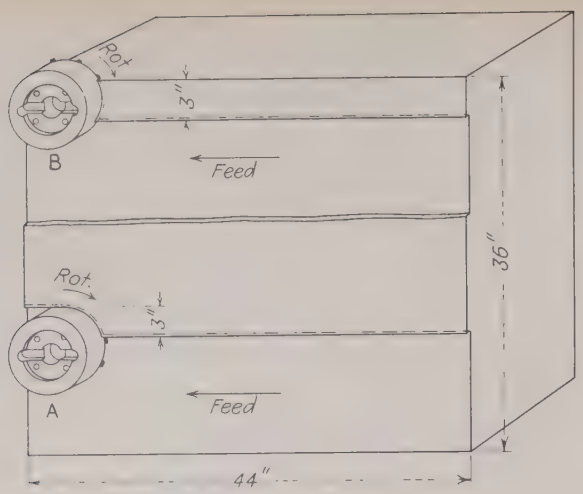


FIG. 3 - Diagrammatic view of a block of steel which was milled with identical cutters through six work shifts.

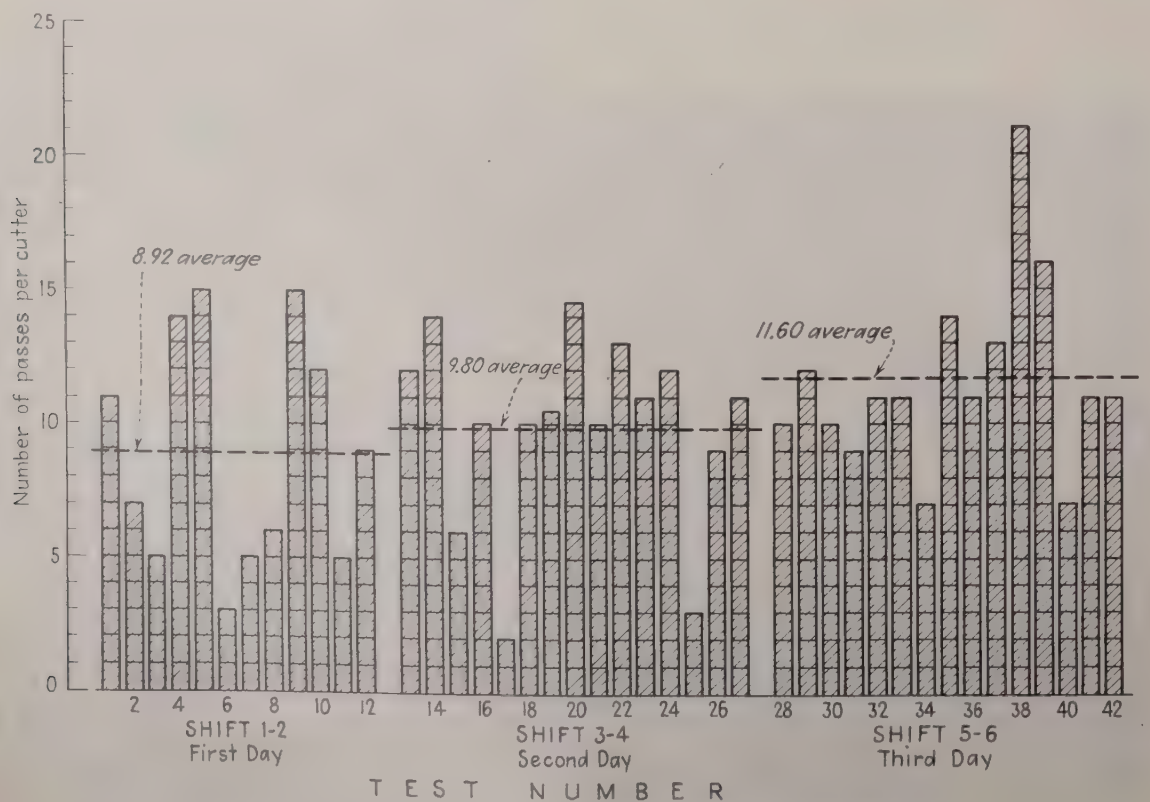
passes per cutter. During the first two shifts the cutters failed more often by chipping or fracture and only 107 passes were completed with 12 cutters. Since this particular machine had seldom been used for such heavy work, adjustments had to be made to correct looseness of clutches and play in shafts and in table movement which became evident during the first shift. During the third and fourth shifts fewer stoppages occurred since the machine was then better adjusted for this operation. Fifteen cutters completed 148 passes. Further improvement can be noted in the fifth and sixth shifts with 15 cutters completing 174 passes. General performance undoubtedly would have been improved had a heavy milling machine, instead of a boring machine, been available.

When the cutter was milling as in position *A* of fig. 3, the wattmeter indicated 15 hp but only 12 hp in position *B*, the decrease being due to the greater efficiency inherent in the formation of shorter and thicker chips.

The cutters used in these tests were reground by experienced operators and had a 6° negative radial rake angle imposed at the cutting edge of a carbide blade positioned in the cutter body at a 15° positive-radial-rake angle.[1] Quite uniform cutter conditions were assured when cutters were returned from the grinding department since all wear marks on the blades were eliminated in each regrinding. Cutters were removed when they showed 1/32-in. wear on the peripheral relief face as illustrated in fig. 5 at the top. The low number of passes on the first and second day was accompanied by cracking or chipping of the carbide blades. This type of failure can occur because of hard spots in the workpiece or momentary stalling of the cutter in the work, resulting from a loose clutch or an unexpectedly heavy chip. Sometimes the grade of carbide used is too hard for the job at hand. Fig. 5, at the bottom, shows a carbide tip that is chipped or flaked on the peripheral relief face.

The results plotted in fig. 4 represent production data under shop conditions as influenced by the machine, workpiece, and, last but not least, a good operator. Had the operator not adjusted the machine, if the cutters had been improperly ground, or if the workpiece become more difficult to machine, the gradual increase in production from one shift to the next might never have happened or an actual decrease might even have

FIG. 4 - This graph shows the number of passes made with each cutter in three successive days.

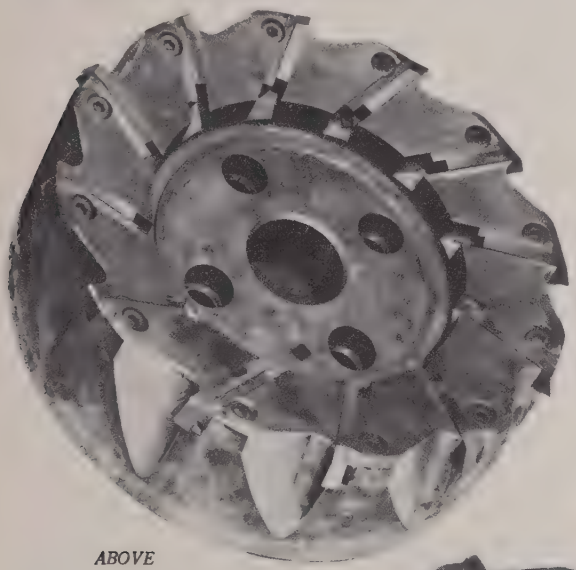


occurred. Fortunately, the tendency toward improvement noted here generally has been observed whenever carbide milling has been given proper, adequate attention.

The graphs in figs. 9, 10, 11 and 12 show the frequency of the various types of wear and failure of carbide cutters. The operation analyzed consisted of face milling alloy steel wing hinges.[2] Cutting speeds, cutter diameter, number of blades, and grade of carbide resulting in good operation had been previously established. The particular type of wear and failure of carbide cutters used in each run was recorded. Three different designs of cutters were used. These cutters were alike in size, number of blades, grade of carbide, relief angles, as well as true rake, the distinguishing feature of each type of cutter being in the manner in which the carbide

ABOVE

FIG. 5 - The carbide tip shown above has worn 1/32 in. on the periphery, while chipping at the corner of the carbide tip shown below necessitated immediate change of tool.



ABOVE

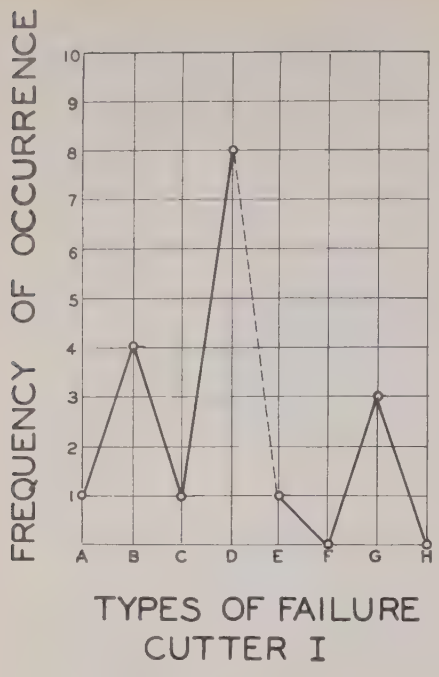
FIG. 6 - This 10-in. CSM face milling cutter has 12 solid sintered carbide cutting blades set at a radial rake angle of 15° positive. A negative radial rake face of 10°,0.025 in. wide, is provided at the peripheral cutting edge. The wedge is in back of the blade to provide uninterrupted chip accomodation space.

ABOVE

FIG. 7 - This 10-in. face milling cutter with 12 solid sintered carbide cutting blades set a radial rake angle of 7° negative and an axial rake angle of 7° negative.

RIGHT

FIG. 8 - This 10-in. face milling cutter, with 12 brazed sintered carbide cutting tips, has the tips set a radial rake angle of 7° negative and an axial rake angle of 7° negative.

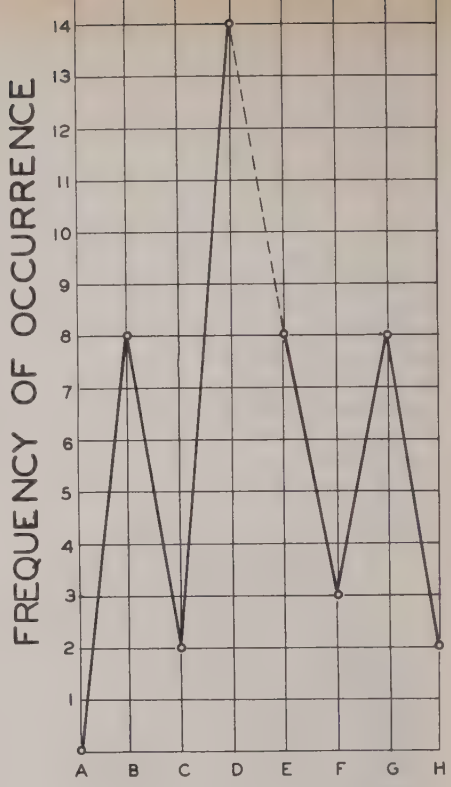


LEFT

FIG. 9 - This graphical analysis shows the type and frequency of wear and failure of 26 face milling cutters of the type shown in fig. 6. This type of cutter was most economical in overall performance and machined an average of 154 pieces per cutter.

RIGHT

FIG. 10 - This graphical analysis shows the type and frequency of wear and failure of 38 face milling cutters of the type shown in fig. 7. More undesirable types of failure and excessive wear occurred with this cutter. An average of 98 pieces per cutter were finished.



material was attached. Cutters with solid carbide blades wedged at either a positive or negative angle and with tips brazed directly to the body were tested. These types are shown in figs. 6, 7 and 8. Altogether, 74 face mills of 10-in. diam, each having 12 teeth were checked.

The machine operator had been instructed to remove the cutter for resharpening as soon as the area of wear on the peripheral relief face became 1/32 in. wide (1/32 in. peripheral wear). Among other reasons, this criterion was chosen because it is easily visible and can be measured with a scale. If this type of wear prevails, it generally indicates that good cutting conditions exist.

Other types of wear and failure occur quite frequently and those observed in these operations are listed in table I. The types of wear designated as A, B, C, and D are the more desirable since they can be rather easily eliminated in a relatively short time by regrinding. Types designated E, F, G, and H are objectionable, because regrinding is more difficult and time consuming,

TABLE I

Types of Wear or Tool Failure Occuring in Three Different Milling Cutters, Shown in Figs. 6, 7 and 8.

Types of Wear or Failure		Cutters* Fig. No. 6	Fig. No. 7	Fig. No. 8
Less Objectionable Types of Wear	A—Excessive Peripheral Wear	1	0	0
	B- Corner Wear	4	8	4
	C—Face Wear	1	2	0
	D—1/32-in. Peripheral Wear	8	14	5
More Objectionable Types of Wear	E—Crater	1	8	0
	F—Excessive Corner Wear	0	3	1
	G—Slight Chipping	3	8	1
	H—Breakages of Some Blades	0	2	0

* Numbers shown indicate how often the particular type of wear or failure occurred in the cutter tested.

and occasional replacement of carbide tips is required. If the latter types of failure occur too frequently it may be necessary to change the cutting speed, feed, depth of cut, grade of carbide, work-holding device, or cutter design; or shift the job to another machine of greater power and rigidity. The frequency of occurrence of these various kinds of wear and failure in the three different cutter designs is plotted in figs. 9, 10, and 11. From this analysis it was possible to determine the type of cutter most economical in regard to carbide wear and regrinding and resetting of blades.

A composite presentation of figs. 9, 10, and 11 is shown in fig. 12. For a given operation this diagram indicates conditions may be such that there is unobjectionable cutter wear, but that a certain amount of objectionable failure and excessive wear will also occur. If wear and failure of the kinds designated by E, F, G, and H of table I result too often, the entire operation may become uneconomical. High cutting speeds, excessively heavy feeds, hardness of workpiece, incorrect grade of carbide, or an overloaded machine are the main contributing factors to objectionable types of failure, especially in milling high-strength alloy steels.

The most commonly used methods of holding sintered carbides in a milling cutter are brazing the tips directly to the body or attaching removable teeth to the body with various mechanical locking devices. A removal tooth is either a steel blade to which a carbide tip has been brazed or a solid carbide blade. Tests indicate that carbide tips properly brazed to the cutter body are as strong as mechanically held blades. A cutter with tips brazed to the body is often the best selection in certain instances and is usually lower in initial cost. However, in long production runs,

cutters with mechanically held blades will be more economical because resetting the blades in case of breakage or for resharpening is more simple and less time consuming. A hardened steel cutter body with mechanically-held blades is not weakened or damaged by repeated regrinding and brazing.

A typical time study is shown in table II of the reconditioning of a cutter with tips brazed to the body shown in fig. 8. Moving time between shop departments is not included.

An identical cutter shown in fig. 7, with solid sintered carbide blades wedged into the cutter body at a negative radial rake angle also required 35 min for regrinding, but only 15 min for resetting a blade in case of breakage. After four or five resharpenings all blades must be reset and sharpened, but this requires only 1½ hr.

The CSM cutter, shown in fig. 6, with solid sintered carbide blades wedged into the cutter body at a positive radial rake angle required 45 min for regrinding. Resetting a blade in case of breakage takes 15 min. However, since less material has to be removed in regrinding because of this particular blade design, this cutter can be resharpened eight to ten times before resetting and sharpening, which requires 1½ hr, is necessary. Less breakage of single tips is another factor in its favor. In production runs fewer cutter changes with attendant delays will occur and number of workpieces finished per cutter will be high.

The number of workpieces machined per hour with a particular cutter is of prime importance in determining the economy of a carbide milling operation. Loading and unloading time is often much greater than actual cutting time and therefore much attention must be directed to decreasing this time with proper holding devices or fixtures. Rigidity of both the setup and the milling machine and adequate power as well as proper choice, use and servicing of cutters will help to "cut cost."

ACKNOWLEDGEMENT

Acknowledgement is made to J. R. Roubik and Harold Francke of Kearney & Trecker Corp. for the help in the tests reported in this article and for the photographic work, respectively.

References

1 "Radial Rake Angles in Face Milling," by J. B. Armitage and A. O. Schmidt, Mechanical Engineering, Vol. 67, No. 8, August, 1945, pp. 507 to 510.

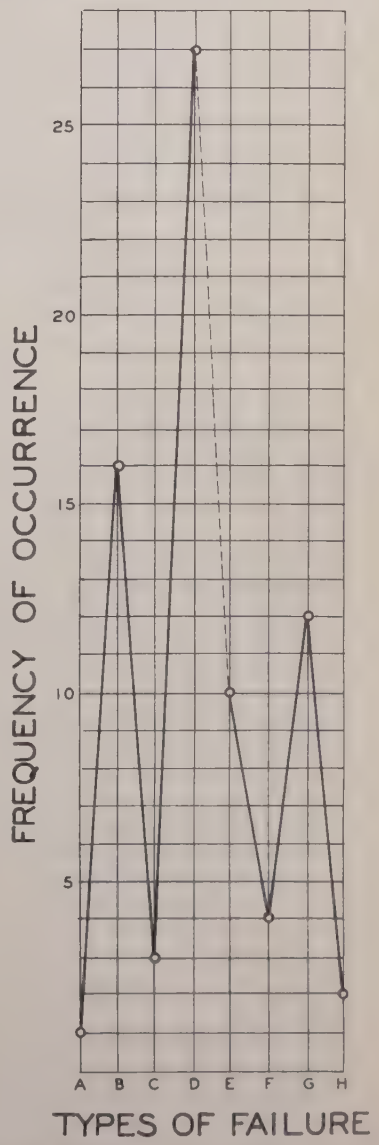
2 "Data on Production Runs with Carbide Milling Cutters," by A. O. Schmidt, THE IRON AGE, Vol. 156, No. 21, pp. 54 to 57, Nov. 22, 1945.

TABLE II

A Typical Time Study of the Reconditioning of a 12 Tooth Face Mill With Tips Brazed to the Cutter Body, Excluding Moving Time Between Shop Departments.*

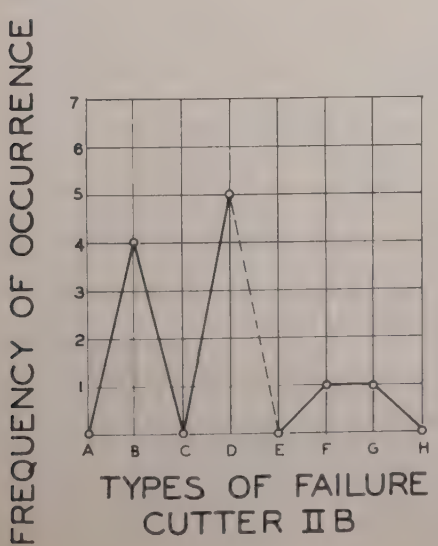
Operation No.	Operation	Time, Min.
1	Selecting, Grinding and Delivering New Tips to Brazing Dept.	10
2	Removing Old Tips and Brazing New Tips	54
3	Sandblasting Cutter	8
4	Grinding Faces of Teeth	45
5	Grinding Periphery of Cutter Teeth	48
6	Finish Grinding Relief and Clearances	45
	Total Time	210 Min. or 3½ Hr.

* If tips do not break, the cutter can be resharpened in 35 min, but can be resharpened only about three to five times before it must go through the reconditioning procedure outlines. In the event that only one tooth is broken, a new tip must be brazed on by following the outlined sequence, and to put the cutter into working condition again, about 100 min is required.



RIGHT

FIG. 12 - This is a graphical analysis of the wear and failure of all three types of cutters shown in figs. 6, 7, and 8. They were used on the same job and machine.



LEFT

FIG. 11 - This graphical analysis shows the type and frequency of wear and failure of 10 face milling cutters of the type shown in fig. 8. Although the performance of this type cutter was satisfactory, the replacement of tips was frequently necessary and more expensive than with the other cutters. An average of 147 pieces per cutter were finished.

The Standards Department

— *Its Organization*

o o o

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o o o

ALL manufacturing companies have specifications. Just why and how they arrive at those specifications is very often nebulous. Very few manufacturers have taken the trouble to really standardize all specifications on all materials used in production. That those manufacturers who haven't a real standards program are throwing dollars down the drain is evident from this report. Why does a company use a host of different steel gages, sizes and types, some of which vary only minutely? Who decides whether the finish on bolts and nuts should be black, bright, galvanized, nickel or cadmium plated? Should screws of dozens of different types be inventoried in dimensions of 1/32-in. increments? What is the best cure for the unnecessary wasteful and prevalent habits of the lack of standardization? Stewart-Warner Corp. believes they have found a method worthy of consideration by others, who wish to prevent one of the seemingly innocuous bad habits of industry, which adds unsuspected high cost in present production.

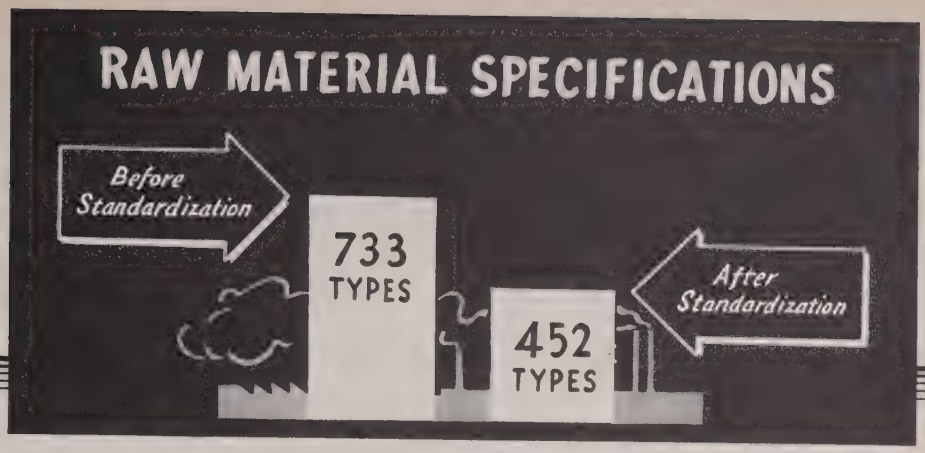
A complete standardization program for a manufacturing concern includes the application of the principle of reduction of variety of both material and effort, and the setting up of logical size or capacity increments to the following three activities:

1—Things purchased
  (a) Raw material
  (b) Parts
2—Things manufactured
  (a) Parts
  (b) Sub-assemblies
  (c) Models (products sold)
3—Methods of manufacture
  (a) Processes
  (b) Design and drafting practices.

Because both the things manufactured and the goods sold are included, it is apparent that there are two interrelated avenues of approach to this problem. One approach is through the sales department, involving primarily the line of products to be carried. Based on a market analysis and a sales analysis much can be accomplished in the elimination of special items, the redesign of standard items to cover a wider field of usage, and the setting up of logical and uniform size or capacity increments. The engineering department is of course involved, but the emphasis here is on sales and sales policies. The limiting factors are inherent in the type of product and the type of customer.

The second approach is through the engineering department. It was felt that the engineering department could make a contribution to cost reduction regardless of whether the sales approach be attempted or not, however, desirable it may be that both types of standardization be carried out simultaneously. It is with this second approach that this article is primarily concerned.

Broadly speaking, then, by narrowing down the effort to the engineering approach, the first step in defining the problem was taken. At this time we had no standards department and no concerted effort of any kind along these lines.



and Function

A standards group, according to the author of this article, must be a part of the line organization responsible for product design. As a pure staff function the department cannot work in the most effective manner. Standardization is not an intermittant activity, it is ponted out, for intra-company standards vary as new products are added. Some remarkable findings of the department at Stewart-Warner are cited as examples of the definite contributions a standards department can make in reducing manufacturing costs and improving quality.

The next step was to analyze the points of attack in the enginering picture. Here the interest was with (1) raw material, (2) purchased parts, (3) "make" parts, and (4) processes such as heat treatment, plating, chemical processes, and spraying. It was decided to go to work on these four items.

This plan determined the form of the original organization. One man was assigned the task of classifying all the differnt raw materials used by type, grade and size. A second man classified and tabulated all the purchased parts. A third man set up a classified parts file or *similarity file* of all parts which were manufactured, and a fourth analyzed specifications for plating, spraying, etc. All of these men reported to the standards engineer whose responsibility was to direct and coordinate the program. The standards engineer reported to the chief engineer.

In general the functions of the standards department were to:

1—Compile, publish and maintain all specifications covering,
   (a) Raw material
   (b) Purchased standard parts
   (c) Processes

2—Reduce the variety of types, grades and sizes of raw material, purchased parts, and "make" parts and the variety of metallic coatings and colors of sprayed enamels and lacquers.

Proceeding on this basis, the results in brief outline were as follows: Difficulty was immediately encountered because of the chaotic state of the material specifications which covered less than half of the materials being used and, further, were obsolete and overlapping. The company's drawings carried its own specification number (if we had one), SAE specifications, AISI specifications, GE specifications, Chrysler specifications, and simply the name of the material or a trade name of a single vendor. For example, vulcanized fibre was identified under such names as "Armite paper", "electrical gray fibre paper", "Conite", "fish paper", "hard gray fibre", "gray horn fibre", and several others.

The aid of the chief metallurgist was enlisted to write a complete new set of raw material specications. A system of numbering these specifications was adopted which enabled us to group all the grades of any particular type of material together in one specification.

For example, specification number 100-00 covers cold rolled carbon steel sheet and strip

as far as dimensional tolerances, edges, shipping instructions, etc., are concerned which apply generally to all the various grades of this material. The next section of this specification is numbered 100-01 and covers drawing quality, referring to 100-00 for its general properties and defining the particular qualities such as chemical analysis and hardness required for this grade. A specimen page from the raw material index is shown in fig. 1.

The purpose in using a straight numerical system was to facilitate the use of the specification numbers on punched card tabulating machines. This broke the log-jam in record files and stockrooms. Each material had a number which followed it all along the line from blueprint through purchasing ,inspection, stockroom, handling, right up to the machines.

At the start there were 733 items carried in stock and on records under all sorts of names

STEWART-WARNER STANDARDS

Index — Ferrous Metals

	S-W Spec. No.
CARBON STEEL SHEET AND STRIP:	
Cold Rolled Sheet and Strip:	100-00
Drawing Quality	100-01
Soft Commercial Quality	100-02
Quarter Hard	100-03
Half Hard	100-04
Hard Commercial Quality	100-05
Perforated—Diagonal	100-11
Perforated—On the Square	100-16
Perforated—Staggered	100-21
Perforated—Slotted	100-26
.020 Carbon Soft (1020)	100-31
Hot rolled Sheet and Strip:	101-00
Pickled Commercial Quality	101-01
Pickled Physical Quality	101-02
Foor Plate—Standard	101-10
Floor Plate—Light	101-11
Terne Plate:	102-00
Extra Deep Drawing	102-01
Deep Drawing	102-02
Magnetic Ingot Iron Sheet and Strip	108-01
CARBON SPRING STEEL STRIP:	
Carbon Spring Steel strip:	130-00
35-55 Carbon Annealed	130-01
35-55 Carbon Tempered	130-02
35-55 Carbon Cold rolled	130-03
55-75 Carbon Annealed	130-11
55-75 Carbon Tempered	130-12
55-75 Carbon Cold Rolled	130-13
75-90 Carbon Annealed	130-21
75-90 Carbon Tempered	130-22
75-90 Carbon Cold Rolled	130-23
90-105 Carbon Annealed	130-31
90-105 Carbon Tempered	130-32
90-105 Carbon Cold Rolled	130-33
ALLOY STEEL SHEET AND STRIP:	
Eectrical Sheet and Strip:	145-00
Armature	145-01
Electrical	145-02
Motor	145-03
Dynamo	145-04
Transformer	145-05
Magnet (3.5 Cr.) Strip:	146-00
Annealed	146-01
As Rolled	146-02
Magnet (4.5 Cr, 3.5 Mo.) Strip:	147-00
Annealed	147-01
As Rolled	147-02
Magnet (6.0 Cr.) Strip:	148-00
Annealed	148-01
As Rolled	148-02
Magnet (17.0 Cobalt):	149-00
Annealed	149-01
As Rolled	149-02
Magnet (3.25 Cobalt):	150-00
Annealed	150-01
As Rolled	150-02

	S-W Spec. No.
STAINLESS STEEL SHEET AND STRIP:	
Dimensional Tolerances and Finishes for Chromium-Nickel and Chromium Stainless Steel Sheet and Strip	160-00
Chromium-Nickel (302B)	165-00
No. 1 Finish	165-01
No. 2D Finish	165-02
No. 2B Finish	165-03
Chromium-Nickel (302)	166-00
No. 1 Finish	166-01
No. 2D Finish	166-02
No. 2B Finish	166-03
No. 4 Finish	166-04
No. 6 Finish	166-05
No. 8 Finish	166-06
No. 3 Finish—Light (Strip)	166-07
No. 3 Finish—Spring (Strip)	166-08
Chromium-Nickel (304)	167-00
No. 1 Finish	167-01
No. 2D Finish	167-02
No. 2B Finish	167-03
No. 4 Finish	167-04
No. 6 Finish	167-05
No. 8 Finish	167-06
No. 3 Finish—Light (Strip)	167-07
No. 3 Finish—Spring (Strip)	167-08
Chromium-Nickel Stainless (310)	168-00
No. 1 Finish	168-01
No. 2D Finish	168-02
No. 2B Finish	168-03
Chromium-Nickel Stainless (321-347)	170-00
No. 1 Finish (321)	170-01
No. 2D Finish (321)	170-02
No. 2B Finish (321)	170-03
No. 1 Finish (347)	170-11
No. 2D Finish (347)	170-12
No. 2B Finish (347)	170-13
Chromium Stainless (410)	171-00
No. 1 Finish	171-01
No. 2D Finish	171-02
No. 2B Finish	171-03
No. 4 Finish	171-04
No. 6 Finish	171-05
No. 8 Finish	171-06
No. 3 Finish—Bright (Strip)	171-07
Chromium Stainless (420)	172-00
No. 1 Finish	172-01
No. 2D Finish	172-02
No. 2B Finish	172-03
Chromium Stainless (430)	173-00
No. 1 Finish	173-01
No. 2D Finish	173-02
No. 2B Finish	173-03
No. 4 Finish	173-04
No. 6 Finish	173-05
No. 8 Finish	173-06
No. 3 Finish—Light (Strip)	173-07
No. 3 Finish—Spring (Strip)	173-08
Chromium Stainless (446)	174-00
No. 1 Finish	174-01
No. 2D Finish	174-02
No. 2B Finish	174-03
Stainless Clad (20% Type 302)	175-00
No. 1 Finish	175-01
No. 4 Finish	175-02

and numbers. When the job was finished it was found that there were actually only 452 different items. By merely clarifying specifications, a 38 pct reduction in records and stockpiles had been effected—and actual satndardization had not yet started. It must be said at this point that much of this confusion resulted from the last war, but it is, in our opinion, a convincing argument for the importance of keeping material specifications up to date and systematic.

Armed with the new specifications, Stewart-Warner set out to reduce the variety of materials in two ways: (1) Type and grade and, (2) size. Table I shows the results of these efforts in the heavy tonnage items as far as type and grade are concerned.

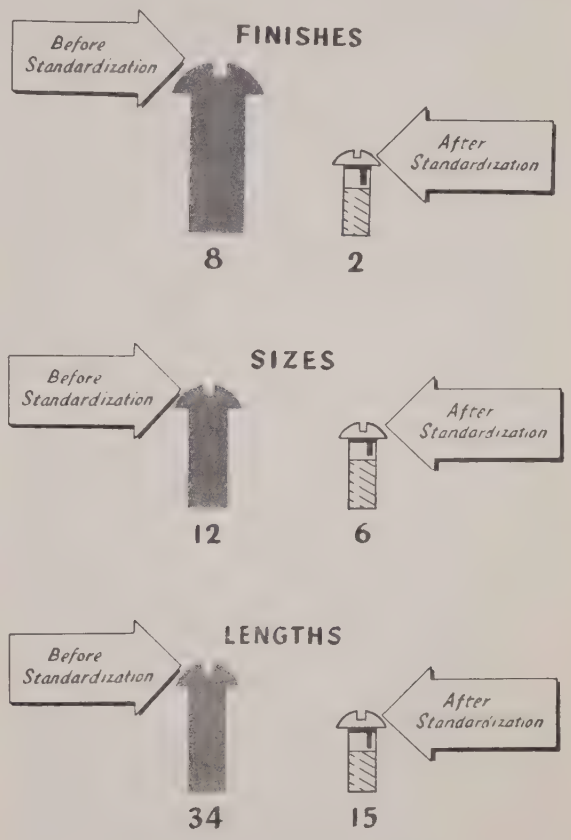
When it came to sizes of material, the problem was not so simple. For example, drawings called for 90 thicknesses of cold rolled steel. Many of these sizes were special for a single part, and in some the requirements were as low as 5 lb per year. Of course, this is to be expected from the lack of any system for telling designers what sizes of material to use in their designs. Another contributing factor is the well known variety of gage systems which is beyond the control of any particular standardization program.

It was out of the question to make wholesale changes on the 15,000 active parts in production which would affect tools and fixtures and interchangeability with old parts from a service angle. A "hold the line" policy on all new design was adopted and the problem of changing current production was gradually worked out. In this way some of the problems solved themselves as parts whose service period had run out were cancelled.

Plain carbon steel thicknesses were analyzed and 21 thicknesses from 0.008 to 0.180 in. were adopted which was a compromise between the popular sizes, the existing gage systems, and the geometric progression theory of Preferred Numbers (ASA Z17.1). Cold rolled steel is used in five tempers from drawing quality to full hard. Ninety thicknesses with five tempers in each gave a theoretical possibility of 450 inventory items exclusive of coil widths or sheet lengths and widths. In the remaining 21 thicknesses a further analysis was made and it developed that not all the five tempers were required in each of the thicknesss, which would be 105 inventory items, but that it would be possible to get along with only 63 combinations of temper and thickness. This is shown in table II. This table was then issued to all designers for their guidance The same type of analysis was made and the results issued for brass and aluminum and also for all nonmetallic material.

Purchased parts dealt with at the Stewart-Warner plant are mostly nuts, bolts and screws, lockwashers, resistors, condensers, etc., much of the standardization of which has been done on a national basis. It was found, however, there is considerable room for reduction of variety in a particular company. For example, if a pan head sheet metal screw will do everything that a round head one will do and possibly have some advantages as far as head height is concerned, then why use round heads at all?

Furthermore, it was found that, except in rare instances, it was possible to get along without No. 1, No. 3 and No. 5 machine screws. Cases of screws dimensioned to 1/32-in. multiples on the length were found. With the commercial tolerance on length plus or minus 1/64 in., it would be impossible to differentiate between a high side 3/8-in. screw and a low side 13/32-in. screw. It also developed the screws had a multiplicity of finishes such as white nickel, cadmium, Parker-



ized, bright nickel, chromium, black, oxide, etc. As far as the chrome plated screws are concerned there can be little argument because they are intended to be decorative, but when it came to white nickel, cadmium and Parkerized, where appearance was not a factor, the finish used occurred haphazardly throughout all the products.

Here again, as in the case of raw materials, a book maintaining all the preferred types, sizes and finishes of about 10,000 common parts for the use of designers was issued. Length increments for screws were 1/16 in. to ¼ in., ⅛ in. from ¼ to 1 in., and ¼ in. above 1 in. The end results, taking round head machine screws as an example, are shown in table III.

In the classification of "make parts", reference is to parts manufactured by ourselves. At this writing the job is far from complete. It was started later than the other lines of endeavor, and it is the biggest and most complete job. The similarity file, which will have about 55,000 parts when completed, is now about 90 pct finished. Here again a hold the line policy was adopted. Duplication and even triplications have been

brought to light; some out-and-out mistakes because of the lack of the file, and others caused by changes such as a case where two parts vary only in color to begin with and then later the color of one is changed making it a duplicate of the other but still retaining the original two part numbers.

The value of this file can be illustrated by taking plain flat steel washers as an example. It was found that the company had 361 different combinations of inside and outside diameters, 60 different thicknesses from 0.004 to ⅛ in., 11 types of steel, all to make 495 washers! Compared with the record of another company which had standardized and found they were making 1919 different washers with one type of steel, 22 thicknesses from 0.004 to ⅛ in. and only 146 different combinations of inside and outside diameter, it can be readily seen that our die cost per washer was considerably higher than theirs.

Another point that was brought out was that each of the 1919 washers was sufficiently different from the others to justify its existence, whereas we had washers that varied in size from another by only 0.001 or 0.002 in. on one dimension. We have not made many new washer dies since the washer file was completed. This item alone has paid for the entire similarity file.

In addition, the similarity file has increased the efficiency of designers and draftsmen who formerly had to spend about 15 pct of their time on a new development search through parts lists of similar models to avoid duplicating parts, which is hit or miss procedure at best. It has facilitated changes that apply to a part and "all similar parts". It is estimated that this has released about 140 man-hr per week for more productive work in the engineering department.

An interesting point about this similarity file is that it occasionally is of value where least expected. In one case we found that by performing one additional operation, a metal gasoline tank float consisting of two cup shaped stampings which are soldered together was converted into a can for a condenser on a radio. Standardization can work across unrelated product lines.

The standardization of process specifications did not contribute any startling savings as far as direct operating costs were concerned, but by establishing a numbering system which automatically classified similar specifications, the usefulness of standardization was increased within the engineering department itself. Formerly specifications of this type were numbered consecutively as the necessity to write them arose. As their number increased it became necessary to maintain an index which would group similar specifications together.

TABLE I

Material	Before Standardization Types	Before Standardization Grades	After Standardization Types	After Standardization Grades
Carbon steel sheet and strip	8	25	4	11
Carbon steel bar and rod	4	22	4	20
Brass sheet and strip	4	21	2	16
Brass bar and rod	4	9	4	9
Aluminum sheet and plate	8	32	6	24
Aluminum bar and rod	5	10	4	8

The following numbering system was adopted. All process specification numbers begin with the letters PS followed by a digit giving its general classification as follows:

PS1—Heat Treatments
PS2—Plating
PS3—Chemical Processes
PS4—Enameling and Lacquering
PS9—Process Control—Specific
PS10—Process Control—General.

Each sub-classification was then designated by letters or numerals separated by a dash. For example, PSI—CY covered cyanide hardening. Details under the subclassification could then be shown by a numeral, two letters and a second numeral separated by a dash. Thus PS1—CY—IDWO would mean, as the specification shown, the *I* signifies 0.003 to 0.005 case, the *D* signifies quench directly from the cyanide bath, the W means quench in water, and the *O* means no draw.

This may seem complicated but the three such specifications covered all the case hardening operations, the one mentioned above and PS1—LC for liquid carburizing and PS1—PC for pack carburizing. Because of its flexibility it has saved the trouble of writing innumerable specifications to cover each combination of operations or making long notes on drawings. In plating PS2—100 is cadmium plating. The dash number following shows the minimum thickness in 0.001 in. Thus PS2—100—2 covers cadmium plating to a minimum thickness of 0.002 in. PS2—100 is standard cadmium plating, should any special process be required, it would be numbered PS2—101 and so on up to PS2—109. Zinc plating then starts at PS2—110, nickel at 120, copper at 130, silver at 140, chrome at 150 and so on, each with a block of ten numbers. In enameling, PS4—E covers all baked enamel finishes, the dash numbers following this indicate the color. Here again the practice is to segregate and classify by blocks of 100 numbers. Thus the PS4—E—100 series are blacks, the PS4—E—200 series whites, and so on.

Three sample steel panels of each color are made up by the industrial design department. The color number is stamped on the panels and one is sent to the enameling department, one to inspection and the third retained in a permanent file in the standards department where it can be seen by anyone interested in assigning a color to a product.

As new processes come up they can always be fitted into this pattern. It makes it unnecessary to keep a classified index of similiar specifications as they are always automatically gathered together in a group.

Up to this point three volumes of Stewart-Warner Standards—Vol. 1, Standard Parts; Vol. 2, Raw Materials, and Vol. 3, Process Specifications—had been issued and it was felt that progress had been made. But it became obvious, as the project developed, that a standards department which merely analyzed a mass of data with the idea of reducing variety, and issued the results for design purposes, is doing only part of the job. Functioning thus as a staff department only, it has no contact with real problems. Further, it has no control over or power to en-

TABLE II

Preferred Thicknesses for Cold Rolled Steel

Thickness Specification	008	010	012	016	018	020	025	032	035	042	049	058	065	072	083	095	109	120	134	156	180
100-01	..	..	..	x	x	x	x	x	x	x	x	..	x	..	..	x	..	x	..	..	.
100-02	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
100-03	..	..	..	..	..	..	..	x	x	x	x	..	x	x	..	x	..	x	..	..	.
100-04	..	..	..	..	..	..	..	x	..	x	x	..	x	..	..	..	..	x			
100-05	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			

force standards.

Also, it is not enough merely to establish the preferred types, grades, and sizes of materials. If we are really interested in cost reduction in each particular instance, it must be determined that the proper material is specified in the first place. For example, the plant was using nothing but the finest grade of laminated phenolic sheet for all parts requiring this type of material. Out of 110 parts, only four really required this quality. This is not necessarily a reflection on design engineers. They cannot be expected to keep up to date on all the cost factors involved in the selection of a material.

To meet this problem the standards department was changed from a purely staff status and made a part of the line organization responsible for design. To get this specialized knowledge required, a materials engineer was added to the group.

In outine, the personnel and their individual functions are now as follows:

1—Material Engineer

(1) Acts in advisory capacity to engineers and designers in the selection of the proper materials and heat treatments, applying his knowledge of the chemical and physical properties of material; the methods used in fabricating them, and their relative cost as affecting the cost of the finished product. He is functionally responsible to the chief metallurgist.

(2) Draws up and maintains all raw material and heat treatment specifications (Vol. 2 Standards)

(3) Explores the possibilities of using new or different materials to effect reduction in cost or better performance consistent with the requirements of the parts.

2—Purchased Parts (Assistant Standards Engineer)

(1) Sets up tabulated lists of all standard purchased parts (Vol. 1 Standards) and issues and maintains tabulated lists of preferred common parts such as screws, bolts, nuts, rivets, pins, etc.

(2) Assists engineers and designers in the selection of such parts by applying his knowledge of all the available parts on the market and their relative costs as affecting the cost of assembly.

3—Similarity File Clerk

(1) Groups "make" parts according to similarity of functions.

(2) Sub-classifies parts within the group according to similarity of shape and size.

(3) Maintains the file in up-to-the-minute condition with regard to engineering changes and release of new parts.

(4) Maintains file of all "foreign" specifications for materials and processes such as government specifications, customer's specifications, and the standards books of such companies as General Motors, Chrysler, Philco, etc., the published standards of ASA, SAE, ASTM, etc., and various manufacturers specifications and catalogs.

4—Process Specifications (Assistant Standards Engineer)

(1) Assists engineers and designers in the selection of the most suitable plating, spraying, etc.

(2) Writes and maintains all process specifications (Vol. 3 Standards).

(3) Maintains file of all colors used in production and also all colors specified on purchased parts.

5—Engineering Manual

This manual (Vol. 4 Standards) contains design standards and drafting practice instructions covering such items as standard sizes and tolerances for punched, drilled, and diecast holes; machine finishes, thread dimensioning, etc. Production engineering initiates this type of standards, and the standards engineer acts as coordinator between them and the chief draftsman and issues and maintains the printed standards in their final form.

This organization is geared in with the rest of the engineering department as follows: In the development of a new product each member of the standards department gives assistance, when it is requested of him, to engineers and designers in each particular field. When the design has been completed as far as the experimental drawings and bill of material, and before a working model is built, a complete set of blueprints of the experimental device is sent to the standards department. All the details are reviewed with a fine tooth comb individually and, where necessary, collectively. The materials are scrutinized for suitability for the parts in relation to functions as well as conformity to preferred type, grade and size. All the common attaching parts are examined to see where variety can be reduced. Employing give and take,

(Continued on page 148)

Gas Cyaniding

FIG. 1 - The photograph illustrates the new gas cyaniding furnace described in this article. Insert shows some typical small parts gas-cyanided on a production basis in this furnace.

° ° °

GAS cyaniding has been known for 25 years, but until recently it has been practiced commercially only on a small scale. With new and improved controlled atmospheres and furnaces, some increased popularity for the process has been noticed, although liquid cyaniding is still the predominate method of light case hardening. There is little doubt that gas cyaniding can and does produce equal case characteristics, but before greater acceptance can come about, gas cyaniding must produce clean, and often bright, work, equivalent core properties on low carbon steels, and the equipment must be easy and economical to operate and should be as fully automatic as possible.

To obtain clean bright work by the gas method, a controlled atmosphere must surround the work until it reaches the quench, and the oil must be free of oxygen and must not break down at the surface of the hot steel. To date, bright hardening is only possible on small or thin pieces and will probably remain so until improvements in quenching oils are made.

A new type of gas cyaniding furnace, which incorporates the desirable features mentioned, has been developed and is illustrated in fig. 1. Particularly adapted for cyaniding small thin-sectioned parts, operation is such that work pieces receive individual attention in the quenching cycle. This is illustrated in the schematic sketch, fig. 2, of a section view of the furnace.

The greater percentages of steels cyanided today are the rimmed steels. Many of the parts made from these steels require core properties; typical parts are the self-tapping and sheet metal screws. To obtain the tough core, water or brine quenching from liquid cyanide baths has been the accepted practice. Since atmosphere-controlled equipment for gas cyaniding cannot be successfully connected to water quenching substitute steels with high manganese (or toher alloying elements), are quenched in oil with somewhat the same results. Fabrication difficulties and higher steel cost, in many cases, offset the advantages of the gas method.

Fig. 3 is a photomicrograph of SAE 1015 steel, gas-cyanided at 1600°F for 10 min, and quenched in a superquenching oil. This results in a file-hard case of approximately 0.005 in. and acore of 36 to 38 RC. The photo shows approximately 95 pct transformation to martensite in the core, indicating that the cooling rate was not sufficiently rapid. When the oil temperature was raised from 80° to 130°F, a more complete martensite transformation resulted. This example and further tests have shown that with this type of equipment, case and core properties equivalent to the use of liquid-cyanided and water-quenched parts are obtainable.

Fig. 4 shows a chart of comparative cooling rates of water, super-quench oil, and regular oil (mineral oil of 100 viscosity at 100°F) to ½ in. diam x 2½-in. long stainless steel specimens quenched from 1500°F. If the TTT curve of,

Small Parts

o o o
By H. N. IPSEN
President,
Ipsen Industries, Inc.,
Rockford, Ill.
o o o

The success of gas cyaniding, on a commercial basis, is said to have been deterred by the inability of existing furnace equipment economically to produce satisfactory surface conditions and metallurgical results. Use of a batch-loading, continuous-unloading gas cyaniding furnace, particularly adapted to cyaniding small thin-sectioned parts, is described in this article. The economic advantages of this process are emphasized, and detailed operating costs for cyaniding a typical part are presented.

say 1015 steel, was transposed, it would have its critical transformation temperature at 1000° to 12000°F. Water quenching from a liquid cyanide bath will actually move the cooling curve of water water at this temperature to the right, since adhering salt and partial batch quenching will not duplicate individual and chemical clean surface contact with the quenching medium. It is necessary, however, to have the absolute ideal conditions in gas cyaniding so as not to disturb the superquench cooling rate.

Two gas-cyaniding units are currently in operation, case hardening sheet metal and self tapping screws 24 hr per day for three manufacturers, meeting the physical requirement standards called for with liquid cyanide water-quenching. The type of equipment used originally was developed for heat treating small SAE 1035 fuse parts. A simple batch-loading continuous-unloading furnace was constructed and later another unit was built, combining the furnace and the quench-tank. Each unit was then electrically-connected to automatically perform the operations of heating, quenching and unloading.

The upper part of the unit is essentially a box furnace, having a usable hearth dimensino of 24x36 in. A quenching chute 6x24 in. extends vertically from the vestibule down into the quenching tank (fig. 2). The hearth has a 4-in. quadrant adjacent to the chute-opening since alloy roller drums are not used. An alloy flexible roller belt rests on the hearth; the power re-

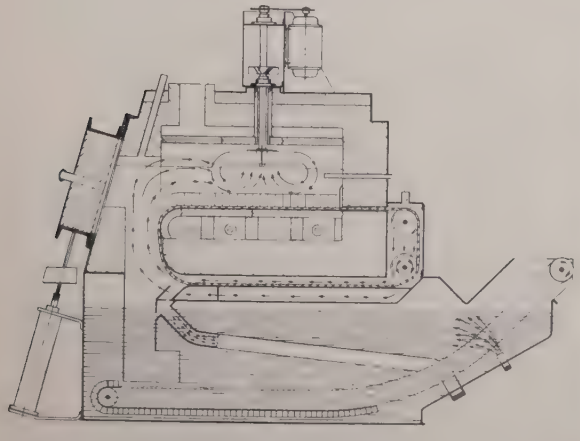
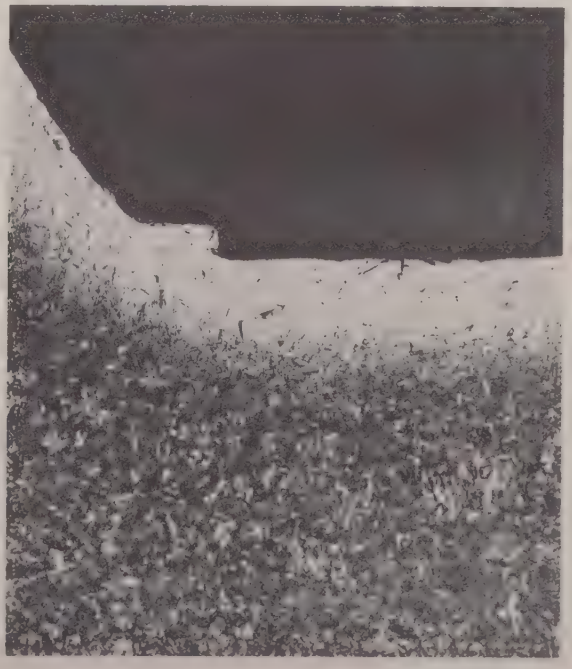


FIG. 2 - When parts are ready for quenching, the alloy belt on which they rest automatically moves slowly forward to drop parts almost individually into quenching medium.



RIGHT

FIG. 3 - Root of the thread of a sheet metal screw. Etchant 2 pct. nital. 100X.

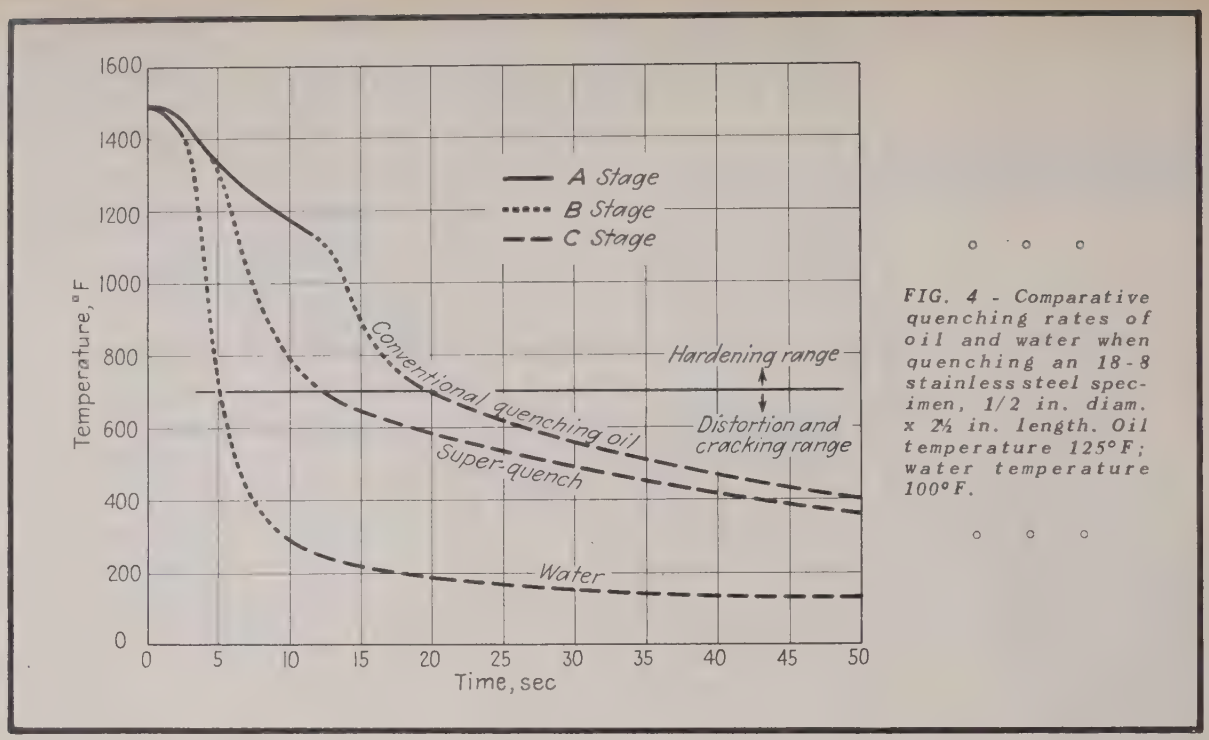


FIG. 4 - Comparative quenching rates of oil and water when quenching an 18-8 stainless steel specimen, 1/2 in. diam. x 2½ in. length. Oil temperature 125°F; water temperature 100°F.

quired to move this belt with a load at 1650°F is less than 1/20 hp. A set of roller chains attached to the rear of the hearth belt pass through the insulation, over two sets of sprockets returning under the furnace, up the chute over a 4-in. alloy quadrant, and fastens to the front of the heat resistant belt. The chain and belt thus coupled together are endless.

Gas-fired units have full muffles and are fired with four burners, two on a side and offset. The flu is not located in the center of the roof but towards the front and absolute uniformity is obtained at all times. Certain units utilize a fan within the muffle for faster heating of small parts. The quench tank rests on the floor, eliminating pits and acting as a supporting member for the furnace. Cleaning of this tank has been simplified, inasmuch as all guides, shafts and supporting members are welded as a unit and are fastened at the rear with two bolts.

The door mechanism employed is a labor-saving device in that it eliminates overhead sprockets, chain, wedges, locking devices and packing trouble. Before the advent of protective atmospheres and sealed doors, furnaces and extended hearths, protruding beyond the door, acting as loading and unloading platforms. The operator worked comfortably, lifting and lowering his work only when the door was closed. In building atmosphere controlled furnaces the old design door was considered impractical to seal and was eliminated. So was the platfrom—a heat treaters tool. To make it worse, in many cases, a gas flame took its place.

The new streamlined furnace has a platform and is without the conventional gas curtain. In fact, the platform has a new duty—it serves as an elevator to help the operator lift and lower. Moreover, none of the sealing features of the door are lost. Only four parts make up the door mechanism; air cylinder, yoke, door and plate. The air cylinder uses no piston rod packing, since air pressure is applied only under the piston. The loading platform yoke is not rigid to the door, for it has free lateral movement for proper sealing.

The operation of the unit, being automatic, requires the operator to merely load a scoop-full of parts on the furnace belt, set two timers, and press a button. One timer is for the heating cycle and the other timer is for the quenching delay. When the work pieces are ready for quenching, the alloy belt on which they rest automatically moves slowly forward into the guide chute to drop the parts almost individually into the quenching oil. As the work pieces drop, the quenching belt moves at twice the speed of the hearth belt, so that the parts are deposited in a thin layer on the belt. After loading, the furnace belt reverses to its original position and the quench belt discharges the work at the rear and continues around to its original position. The light on the panel board then signals that the unit is ready for another batch.

One feature of the unit is the elimination of the alloy atmosphere inlet tube. The atmosphere enters the rear duct, passes underneath the furnace, and enters the heating chamber at the quenching chute. This forms an inside curtain, eliminating cold spots and reducing heat losses. Movement of the quenching oil induces an added cooling rate to the parts being quenched, and coupled with the initial free fall in the oil, even larger pieces will receive adequate cooling speed to pass the nose of the TTT curve.

An example is the hardening of SAE 1035 studs ⅝ in. diam x 5 in. long, gas cyanided for 10 min at heat (bar stock not removed in machining), and quenched in regular quenching oil at 90°F. The core hardness is 50 to 55 Rc. The atmosphere introduced into the furnace consisted of 200 cu ft per hr carrier gas produced by an automatic central station endothermic generator (type 302) with dew point about +2°F and

methane a little less than 1 pct. This carrier gas was enriched with 15 cu ft per hr of 1040 Btu natural gas, and 10 cu ft per hr of anhydrous ammonia. This atmosphere makes possible a hardened case 0.010 to 0.012 in., heat treating at 1550°F for ½ hr.

By substantially reducing or eliminating ammonia flow, the furnace becomes a gas carzurizing and hardening unit. By eliminating both the ammonia and the enriching gas, the furnace is a general heat treating unit. One unit in use for over a year is used exclusively for the bright hardening of small spring steel parts.

Gas cyaniding is economical. A simple accurate method to find total operating cost per furnace hour is to include labor, material and overhead costs for both factory and administration. Labor must be inclusive for all operations performed by the operator, from the time the work pieces enter the heat treating department until they are ready to leave as a finished product.

Referring to the cost sheet, table I, the cost data cover gas cyaniding of 135 lb of SAE 1015 steel sheet-metal screws per furnace hour. The direct labor is based on one operator handling eight units, and having a pay rate of $1.20 per hr. Treating materials are: endothermic gas at 2½¢ per 200 cu ft per hr, ammonia at 6¢ for 10 cu ft per hr, and natural gas at 1¢ for 15 cu ft per hr. Detailing factory overhead, the gas consumption is 160 cu ft per hr natural gas at 5¢ therm (100,000 Btu). A $30 monthly maintenance costs includes labor and material. Inspection, laboratroy, order and service, and receiving and shipping are grounded together and are considered at 1¢ for every 10 lb processed. A large commercial heat-treating plant using approximately the same method of cost analysis shows a total cost of about ½¢ per lb for these items.

Equipment is depreciated and amortized over a 10-year period. Insurance rates total approximately $25 per thousand dollars, and usual tax rates are $5 per $100 yearly on one-half valuation. With 135 lb work hardened per hr, the actual and total gas cyaniding cost per pound is a little less than 0.6¢. Automatic loaders can further reduce costs, but a study made of large and small industrial commercial heat treating facilities indicate that this type of equipment has a total cost lower than any present equipment.

TABLE I

Operating Costs For Gas Cyaniding 135 lb per hr of SAE 1015 Sheet Metal Screws. Cost and Expenses are on a Furnace Hour Basis. Computations Made From Average Plant Statistical Material.

1. Direct labor		$0.150
2. Treating materials		0.095
3. Factory overhead in detail:		
(a) Fuel—Electric		
Gas	0.080	
(b) Maintenance (on equipment)	0.058	
(c) Outside work		
(d) Royalties		
(e) Inspection		
(f) Laboratory		
(g) Order and service	0.135	
(h) Receiving and shipping		
(i) Depr. and amort. (on equipment)	0.064	
(j) Insurance (on equipment)	0.016	
(k) Taxes (on equipment)	0.016	
(l) Occupancy—Building	0.024	
(m) General factory	0.045	
(n) Supervision	0.023	
Total factory overhead		0.461
Cost of work produced		0.706
4. General and administrative		0.096
Total Operating Cost Per Furnace Hour		0.802
Cost per lb		$0.00594

Nondestructive Inspection of Porous Materials

AN inspection method, which makes possible effective investigation of porous, or unfired, ceramic products to locate cracks before firing, has recently been revealed by the Magnaflux Corp., Chicago. The technique, called Partek, is particularly applicable to the nondestructive testing of porous powder metal compacts, insulator bodies, dinnerware, sanitary ware, and similar ceramic materials.

Partek processing may be by hand or by automatic operation and indications may be either brightly colored, to contrast with the body; or fluorescent, glowing when inspected under black light to mark each defect with a brilliant line of light. In operation, the surface of the clay to be inspected is momentarily flushed with a liquid suspension of Partek particles, which adhere along the cracks, held by differential filtering action between the crack and the unbroken surface. The cracks are made highly apparent by the particle indication, which marks them for high-speed viewing and allows defective ware to be quickly separated from good ware entering the kilns (see fig. 1).

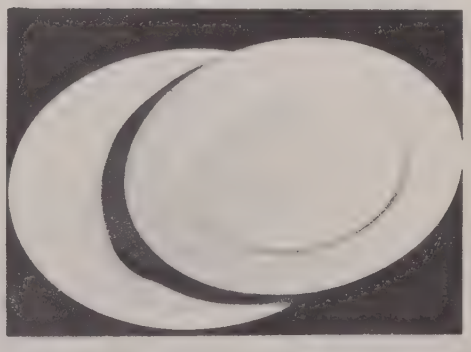


FIG. 1 - Plate at left shows Partek indication of an invisible crack, located before firing. At right is the obvious visible crack if fired.

Salvage is speeded and made more effective on products like sanitary ware where repairing is desired. A visible colored or fluorescent indication is here developed below the surface as upon the surface. Normal scraping is used to remove the crack, following the crack indication beneath the surface until the entire crack is removed completely, to assure that it will not open in firing.

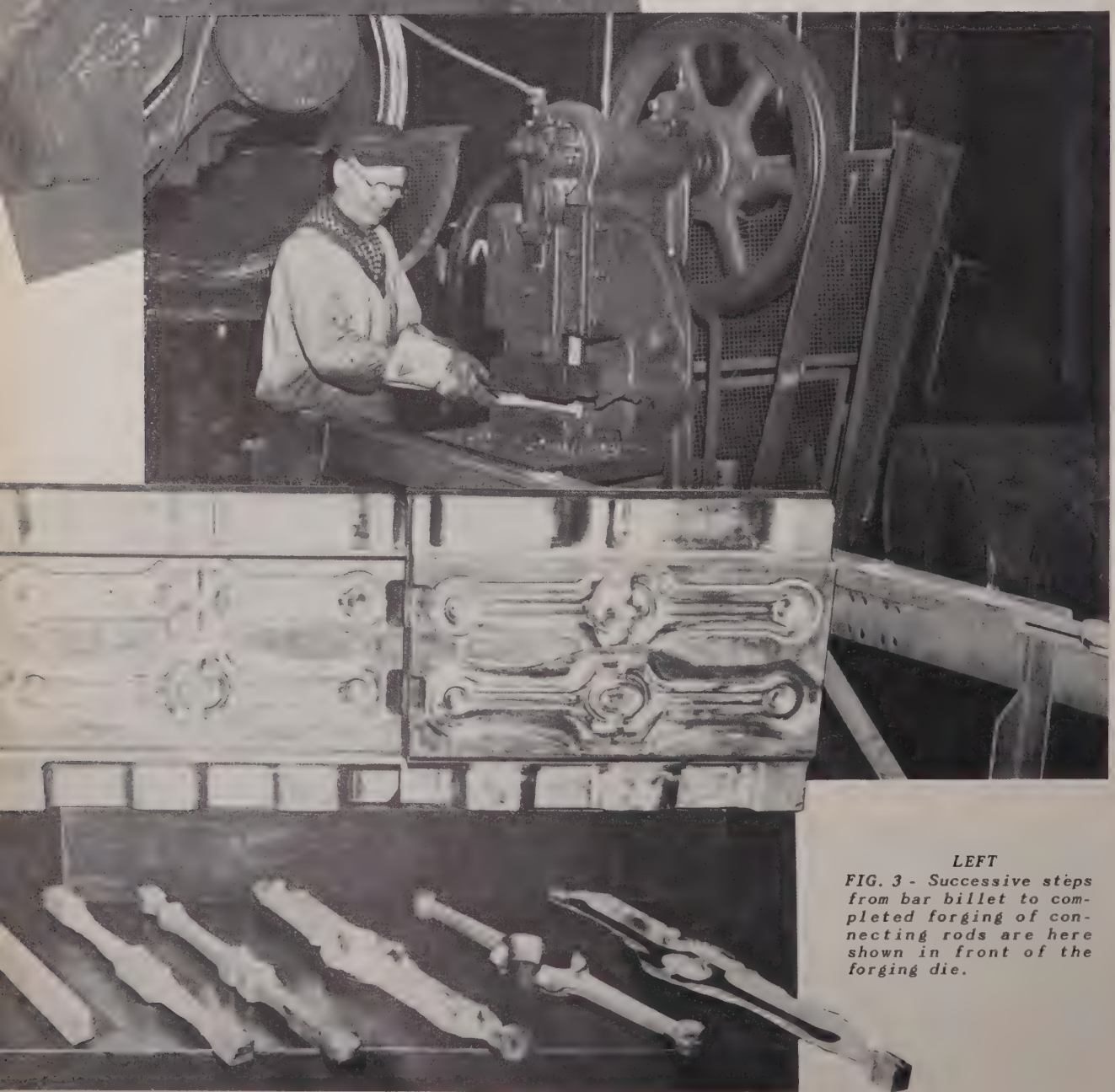
Increased

LEFT

FIG. 1 - Connecting rods are forged in pairs, end to end in this die, at the rate of 225 an hr.

BELOW

FIG. 2 - This shows the hot coining of connecting rods which, after coining, are pushed down a channel into a tote box.



LEFT

FIG. 3 - Successive steps from bar billet to completed forging of connecting rods are here shown in front of the forging die.

Forging Die Life

By HERBERT CHASE

Study of die lubrication and other factors causing die deterioration has reduced die and forging costs and resulted in lower steel consumption and scrap losses. Techniques developed and an outline of present studies aiming at flash thickness reduction are described in this article.

ECONOMIES in the forge shop of International Harvester Co., Ft. Wayne, Ind., have resulted in part from a study of the factors affecting die life; and the introduction of certain changes that have doubled the life of some dies, reduced the consumption of steel per forging, and cut the cost of salvage operations.

Before discussing these economies, the scope of operations of the shop is best outlined by discussing some of the work done. The shop, 62x480 ft., operates 17 steam hammers ranging from 2500 to 10,000 lb capacity and three upsetters of 4 and 6-in. size. These produce about 150 tons of forgings a day for use in all Harvester highway trucks which this plant and another in Springfield, Ohio, manufacture.

All hammers are arranged in a row running the length of the shop. Side areas are used for upsetters, shears and for weighing forgings. Trim presses are set adjacent to hammers to facilitate local handling of heavy billets and forgings by monorail tongs.

Lubrication of hammer cylinders is accomplished by injecting oil into the steam supply line just above the steam shut-off valve at each hammer, under 70 psi pressure. A sight feed is placed next to each such valve so that the oil supply can be shut off when the valve is closed. Oil lines parallel the steam lines so that the oil remains warm and flows readily in cold weather. Once the sight feed is set, when the hammer is put into service by opening the steam valve, the hammerman does not have to bother further about this lubrication until the steam valve is closed and the oil supply is shut off.

Both pusher and box-type furnaces are used and are supplied with a mixture of natural gas and oil, as experience in this plant indicates that such a mixture is more economical or efficient than either of these fuels used separately. Some $6000 a year have been saved on fuel supply in this plant by this means, the saving being attributed to better vaporization of the oil. Some furnaces are equipped with mechanical loaders and all of the pusher-type have automatic thermostatic control of fuel feed.

At present, billets and forgings are handled within the plant mostly in tote boxes shifted by an overhead crane, but fork trucks are being introduced for such handling because they are safer and are believed to be more economical. Cranes will be employed for interior material handling only in areas not accessible to fork trucks.

FIG. 4 - In this dial-feed setup on a Bliss press, 1100 rod forgings are cold-coined per hr on flat faces.

FIG. 5 - Die and successive steps in producing steering knuckle forgings. To provide the most desirable grain flow, the forging is formed from the end of the slug rather than from the side.

Bar stock for forging is stacked according to size and analyses in piles between uprights along a railroad car siding under a craneway outside the plant. All stock is color-code marked on bar ends for identification. Cars are unloaded by the crane, which also moves the stock as needed to racks close to the six shears that are just inside the shop. These racks are equipped with slotted nozzle gas-oil burners. These are used only for preheating alloy steel before shearing. Stock employed varies from about $\frac{5}{8}$ x 1 in. up to 5 x 5 in. Prior to the war, 71 different steel analyses were used, but this number has now been reduced by about half, which simplifies handling, minimizes inventory, and reduces the storage area required.

Typical of small forgings is that for connecting rods produced in pairs, end to end, in a 3000-lb hammer, as shown in fig. 1. These forgings are produced at the rate of 225 an hr. Trimming follows immediately, after which hot coining is done in the press shown in fig. 2. This coining takes the place of a restrike in a hammer die. From the press, the connecting rods slide down a channel into a tote box. Fig. 3 shows the forging die, the square bar stock used, and the forging in successive stages.

After heat-treatment and scale removal, these forgings are delivered to the Bliss press, fig. 4, equipped with a dial type holder. Side faces are cold-coined to within 0.010 in. of specified thick-

FIG. 6 - Two-stage dies are employed for forging front axles, one end at a time. The trim and padding dies used in the press are shown.

FIG. 7 - In this 600-ton toggle press setup, front axle forgings are trimmed (left) and the spring pads are reduced to correct thickness (right).

ness at the rate of 1100 rods an hr. In this press, only one rod is struck per stroke, but the dial is fed automatically while being loaded and unloaded by hand. This coining reduces the thickness by 0.030 to 0.040 in.

Forgings for ring gears are produced from 5 x 5 x 8-in. square billets of SAE 4620 alloy steel in two 10,000-lb hammers at the rate of about 50 an hr. In the first operation, the heated billet is set on end and is flattened to a doughnut shape to provide the desired grain flow. After reheating, the forging is restruck in a die which gives it its final shape. In this, as in many other cases, a steam jet blows scale from the die.

Many round billets are descaled between heating and forging in rotary machines having motor driven rollers on which the bar rests while knives, held against the billet by spring pressure, remove the scale in a very simple and rapid operation.

Among the most intricate parts produced are those for steering knuckles produced in the three-cavity die, fig. 5, usually from 3 1/16-in. billets. Steps in this forging operation are shown by partly and completely forged parts in front of the die. In the first operation, the spindle portion is extruded into a tapered hole in the lower die, leaving the remainder of the billet almost unchanged in size. The second cavity flattens and broadens the large end. The final cavity further flattens this end and forms the bosses and yoke to final forging size, ready for shearing flash. This method of forging the knuckle from the end of the billet slug is not the easiest but yields a superior grain flow and provides a stronger forging than for one forged from the side. The rate of production of this forging is about 60 per hr.

One of the largest forgings produced is that for the I-beam front axle, using the dies in fig. 6, and billets of 2 5/16-in. square SAE 1045 steel, 46 in. long. These billets are heated in box-type furnaces to 2250°F, and are forged in an 8000-lb hammer. Forging is done on one end at a time, in stages, as indicated by partly forged and completely forged parts in front of dies in fig. 6.

Immediately following forging, flash is trimmed off and the forging is placed in a padding die in a 600-ton toggle press, fig. 7, which sizes the forging and reduces the spring pad to the desired thickness. The foregoing operations are repeated, in forging and sizing the second end in the same dies. About 255 axle forgings are produced per 8-hr shift.

After transfer to the heat-treating department, axles are annealed and then go to the hardening furnace. While still hot, however, the axles are put into an Urshel stretcher, shown in fig. 8. Here, the hot forging is gripped on stretcher lugs by hydraulic clamps and the forging is stretched to required length. The clamping and stretching are

FIG. 8 - Axle forgings are clamped, stretched to length while hot, and quenched while still clamped in this Urshel machine.

FIG. 9 - In this 6-in. upsetter the flange of a live rear axle shaft has been formed. Copper tubes supply a soluble oil solution to keep dies cool and wash away scale.

done in a quenching trough and, as soon as stretching is completed, the trough is rapidly filled with water, quenching the piece while it is still clamped. This avoids distortion in quenching and makes straightening before machining unnecessary. After quenching, the axles are put through the tempering furnace and are shot blasted before final inspection and delivery to the machine shop.

Live rear axle shafts are among the forgings that are upset. One such axle is shown in fig. 9 after upsetting the flanged end in the 6-in. upsetter. About 70 pieces an hr can be produced. This axle is made from $1^{19}/_{32}$-in. round alloy bars, $46^{3}/_{4}$-in. long. The small end is previously upset for splining on a 4-in. machine at the rate of 150 an hr. Upsetting dies are kept cool and free of scale by directing continuous streams of soluble oil on die surfaces.

All forgings are weighed out and the count is checked in tote boxes before being delivered to the heat-treating department in an adjacent building. As a similar weight check is kept on steel delivered to shears, a check on scrap is always available. Operators are required to check sample billets cut to make sure that they come within the weight limits required for forging so as to avoid either excessive flash or underweight forgings.

Inspectors check the weight of each of the last five forgings from each hammer at the end of each two-hour period, weighing being done to within 0.1 oz and certain specified dimensions are checked. Charts of dimensions and weights are posted continuously and certain of them are posted at the

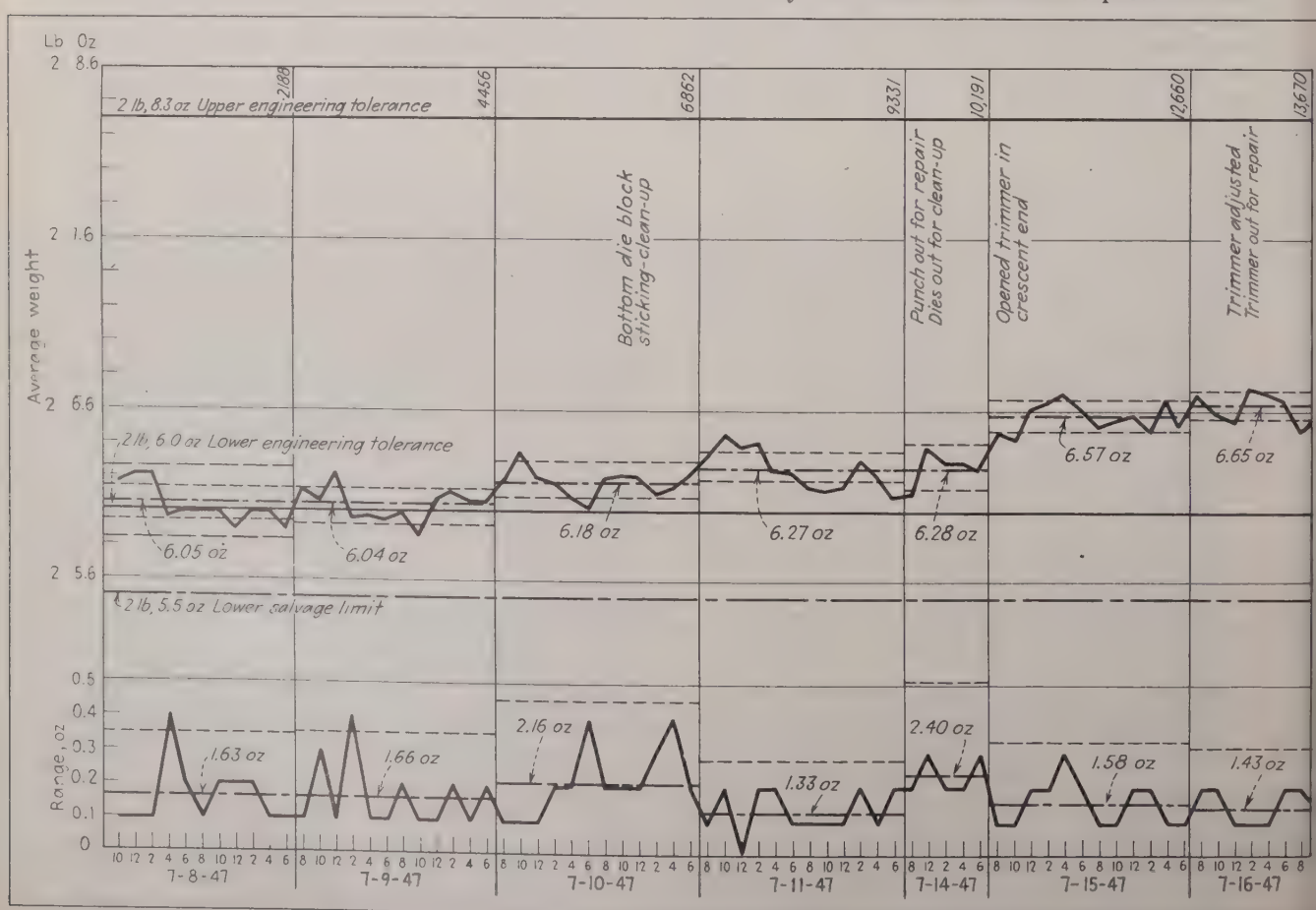


FIG. 10 - These graphs show how the weight of connecting rod forgings varied fore a die lubricatio

hammers so that both foreman and operators have a visible record of the performance of the dies and hammers in use.

If either the weight or a critical dimension falls outside the limits specified, it is the duty of the foreman to locate and remedy the cause. This may require resetting the dies, removal of dies for redressing, or the alteration of some other factor such as a change in the temperature of billets delivered by the furnace.

Such checks are a part of the statistical quality control system which not only serves to keep forgings within required weight and dimensional limits but serves as a check on die wear. If the limits set are not held, scrap losses occur and the job is considered out of control.

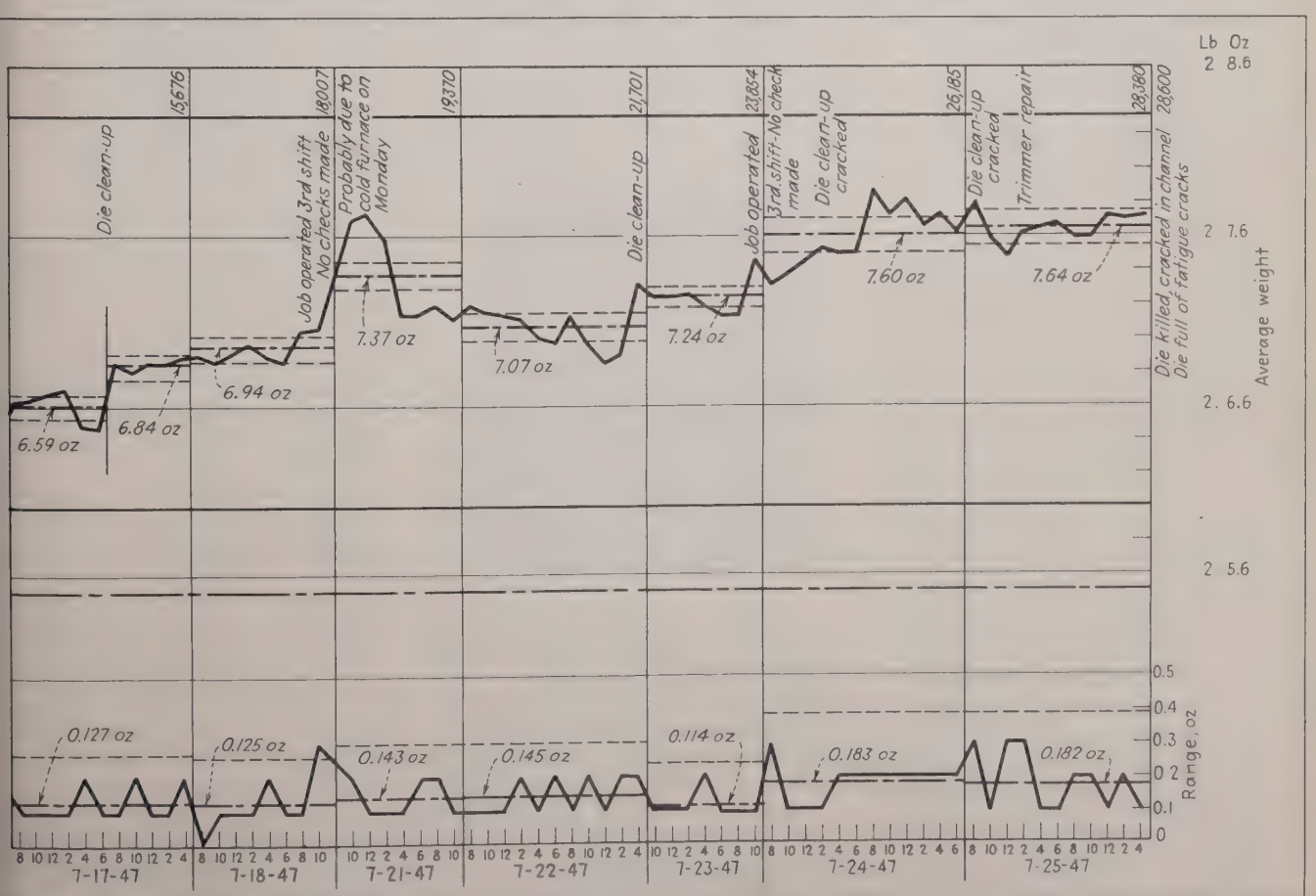
Salvage operations can correct or compensate for some parts rejected for not meeting specifications, but such operations increase costs and can be minimized if not eliminated by giving prompt attention to factors that tend to permit forgings to go beyond tolerance limits. This is a major objective of statistical control, but such control provides a check on die performance, die life, and consumption of steel going into forgings.

Fig. 10 is a control chart involving a progressive impression die for producing connecting rods. The upper graph shows the variation in the weight in pounds and ounces of rod forgings for eight days from Jan. 24 to Feb. 4, 1947. Below this is a second graph which shows the range of weight variation from zero to about 0.6 oz. As the die wore, the weight of forgings increased slowly until on the fifth day, the weight exceeded the upper engineering limit of 2 lb, 8.3 oz that was specified. This resulted in regrinding the die surface and, later, in other die repairs which brought the weight within limits until, on the eighth day, the upper limit was exceeded again and the die was discarded as being beyond economic repair.

Fig. 11 is a similar control chart of a progressive impression die covering a period from July 8 to July 25, 1947. With this die, the rate of wear was considerably less rapid, presumably because of lubrication with Aquadag, a suspension of Acheson colloidal graphite in water, applied before the die was put into service. Some cleanup repairs were made, as indicated, but at no time did the weight of forging exceed the upper limit specified. On the 13th day the die showed considerable checking, but was continued in use throughout the following day, still yielding forgings within the limit weight. At the end of the 14th day, however, a channel crack and numerous fatigue cracks made it unsuitable for further use.

Dies from which the data used in figs. 10 and 11 were obtained were for making the same part and are understood to have been identical except for the use of the lubricant. The study of die lubricants has been proceeding for many months and is continuing. The study has included trials of copper plating. This deposit of copper was found to be a good lubricant, but the thickness of deposit proved hard to control and shipping occurred if too heavy a coat was used.

Use of oil as a lubricant was found undesirable



as the die wears, and the variation in range of weight over an 8-day period before practice was adopted.

as it tended to cause excessive checking and erosion, with resultant sticking and need for die redressing. With Aquadag, however, die life has been nearly doubled. In one type of die, average die life, before studies of lubrication were undertaken, was 11,900 forgings. With Aquadag lubrication, 22,500 forgings have been obtained. Aquadag is applied to the surface of new dies, and they are then heated, face down, until a temperature of about 200°F to a considerable depth is attained. The purpose is to bake the Aquadag on the impression surface. In theory, this impregnates the die surface with graphite. At any rate, it protects the surface during the breaking-in period, making it unnecessary to use oil, commonly applied at this period.

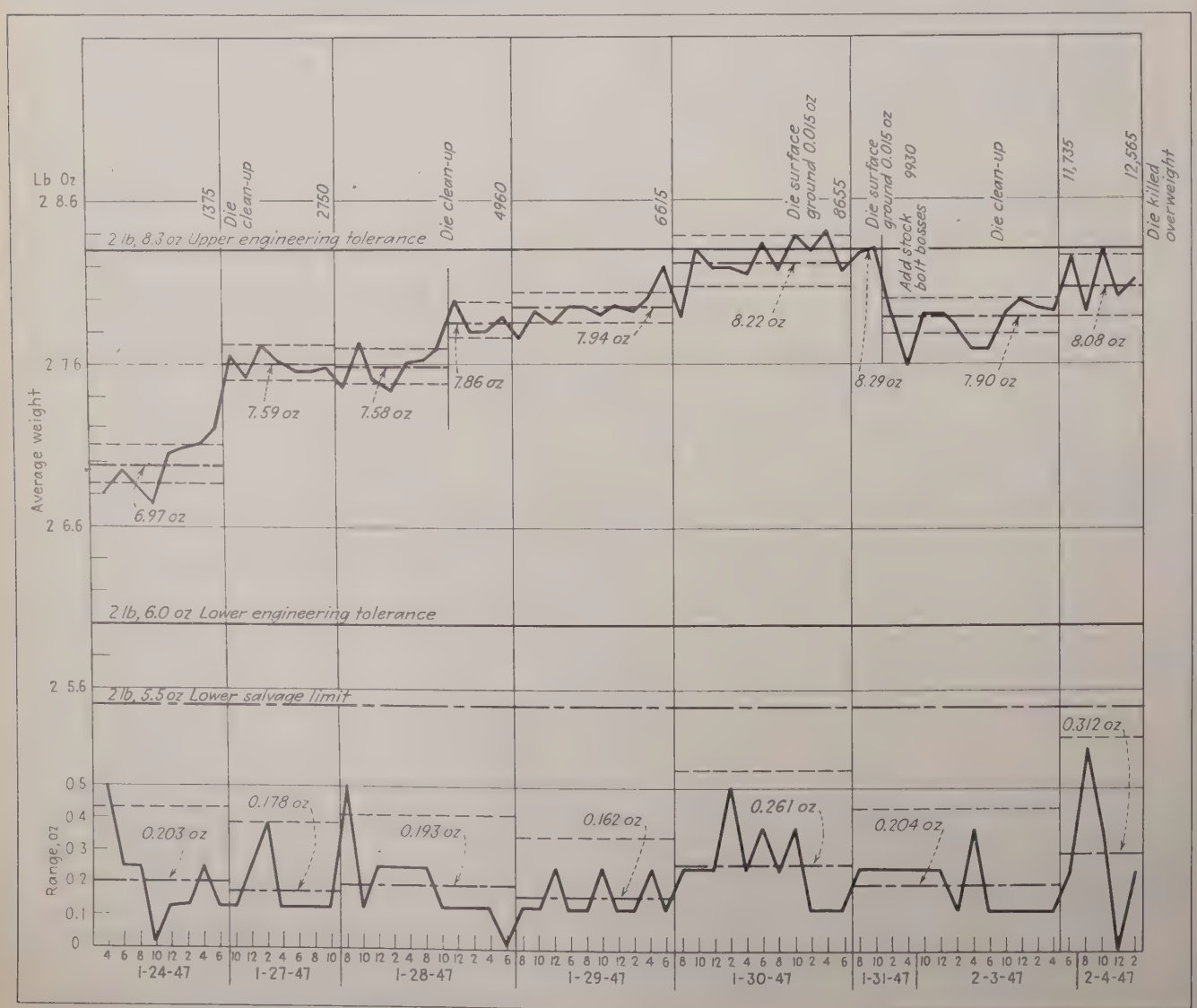
Increased die life, it is admitted, may not be entirely the result of better lubrication, but the latter is regarded as an important factor. Knowledge that a constant check is in progress and the posting of charts at hammers where operators learn to know their significance doubtless has had a favorable psychological effect. The increase in die life represents a significant saving, but it is not the only saving realized.

Heretofore, the practice in this, and presumably in most forge shops, has been to slightly increase billet weight as dies wear. This increases steel consumption. Checks in this plant have shown that no increase in weight is required if a reasonable limit on the weight of the forging is set and maintained, as tests have shown that it can be. On one gear forging, die life was not only doubled but a 2 pct saving in material aggregating about $2000 a year was realized. If this can be brought about generally, as anticipated, a highly significant saving in material will result.

Efforts are continuing along the lines indicated, but they are being extended. One objective tentatively set is the reduction of flash thickness from the $\frac{1}{8}$-in. maximum commonly set to or about half this thickness. If realized, this will effect considerable savings in scrap and will also permit economies in the trimming of flash, as less work on trim presses and trim dies is anticipated.

Economies already realized and anticipated presumably will increase inspection and control costs, but the probable savings may more than offset these costs and result in higher standards in the quality of forgings produced.

FIG. 11 - These graphs indicate the performance of a die similar to that in fig. 10, but lubricated with Aquadag. Die life was increased and at no time did the forging weight exceed the upper weight limit.



New Production Ideas . . .

Gas-fired furnaces featuring cyanide pots, producing gas from Pentane by cold carbureting, an oil, lacquer, or drawing compound coating method for flat stock, lift-truck manipulation of molten metal in a foundry, cleaning steam condenser tubes by a brushing technique, and tube deburring, chamfering, and facing are production ideas discussed this week.

Gas-Fired Pot Furnace

A NEW type pot furnace, known as the Hi-Life gas-fired pot furnace, and featuring cyanide pots

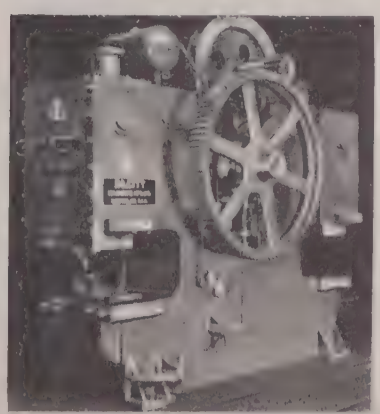
that carry a 1 year guarantee, has been announced by *Lindberg Engineering Co.*, 2444 W. Hubbard St., Chicago. It is reported that furnaces with from 8000 to 15,000 hr of operations behind them are still using original pots. In addition to longer pot life, the manufacturer claims faster heating and greater efficiency. The guarantee covers all Hi-Life pots used with cyanide or lead, neutral salts excluded, under automatic temperature control. The furnace is available in four standard sizes using pots 24x21 in.; 20x21 in.; 16x18 in.; and 12x18 in.

Inserted Carbide Tools

TURNING and facing tools, embodying a mechanical locking device for inserting solid carbide tool bits, have been announced by *Viking Tool Co.*, Nichols Rd., Shelton, Conn. A hardened semi-cylindrical wedge-type lock located beneath the inserted carbide bit is actuated by a screw which locks or retracts the wedge. As the design requires a small percentage of the carbide insert for locking purposes, the insert can be removed from the holder for regrinding, without disturbing the holder setup in the machine tool. The tools are stocked in standard shank sizes from ¾ to 2 in. Tool styles are straight, 15° nose angle, offset, and offset facing.

Double End Punch

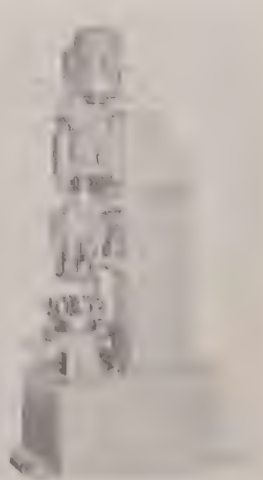
A NEW principle of design has been incorporated in the No. 9 double end punch by *Beatty Machine & Mfg. Co.*, Hammond, Ind., in shortening the distance from punching centers to 9 ft, and employing welded steel instead of the former cast construction. The



shortened machine is more rigid and occupies less floor space. Features include centralized lubrication and air counterbalance of ram. The machine has a 24-in. throat at each end and an architectural table with a front filler block to convert it to a plain table.

Vertical Indexing Machine

DRILLING, counterboring, reaming and milling can be done on the No. 3 vertical automatic indexing machine announced by *W. K. Millholland Machinery Co.*, 1048 Fairfield Ave., Indianapolis 5. The machine is equipped with a No.

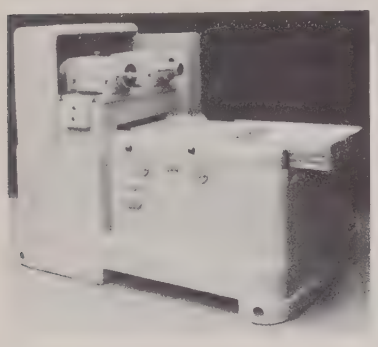


3 Millholland motor-driven automatic cam-feed unit mounted vertically on the welded steel column. The 15-spindle multiple head is mounted on guide bars and equipped with a bushing plate arranged to register on the fixture at each index. The power-driven index table is mounted in large capacity, anti-friction bearings and runs in oil. Three, four, six, eight and twelve station tables are obtainable. Automatic continuous cycle or intermittent operation is controlled by pushbutton. One piece is completed at each index, giving a production of 500 pieces per hr. The machines are available in sizes up to 15 hp motor drive.

Heavy Duty Boring Machines

TWO Bore-Matics, Models 421 and 422, announced by *Heald Machine Co.*, Worcester 6, handle heavy work without the necessity for special out-size equipment. Like other Bore-Matics, the machines

are capable of boring, chamfering, turning, grooving, facing or fly-cutting operations separately or in any desired combinations. The single-end Model 421 and the double-end Model 422 are suited for mass



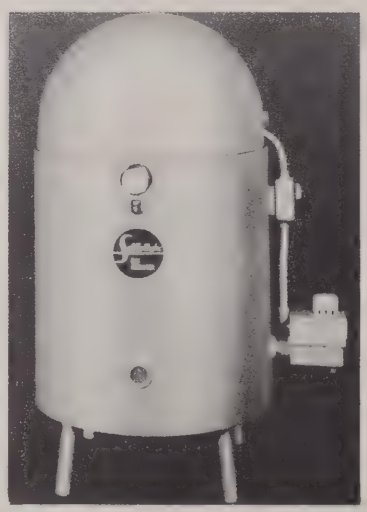
production of a single part requiring several operations or for single or multiple operations on several parts simultaneously. Outstanding features include adequate power for roughing, permanently lubricated boringheads, uniform hydraulic feeds, and smooth table motion. Simple control settings provide different rates of in and out feeds when two-way boring is required.

Roll Coating Machine

COATING of flat material with drawing compound, oil, glue, sizing, wax, paint or lacquer can be done with roll coating machines offered by *Columbia Machinery & Engineering Corp.*, Hamilton, Ohio. The machine features 10-in. coating rolls and 8-in. doctor rolls. Large coating rolls reduce the angle of departure from the work, providing a more uniform spread. The doctor roll turns at a slower speed than the coating roll, the difference in speed producing a wiping action that contributes to evenness of spread. Depth of spread is set and maintained by an adjustment of calibrated handwheels. Standard coating rolls have a corrugated rubber surface with circumferential grooves, 0.025 in. deep, spaced 20 per in. Coating and doctor rolls are driven through a positive chain-and-sprocket drive and a geared-head motor, standard drive speed being 75 fpm. Coating machines are made in four roll arrangements for coating one or both sides of the material, and in roll sizes from 32 to 104 in. by 6-in. increments for handling material up to 102 in. wide. Material up to 4 in. thick can be accommodated.

Gas Producer

PRODUCTION of gas from Pentane (C5-HI2) by a cold carbureting process can be accomplished in the Safe-Tee-Way gas producer, an electrically operated machine announced by *Austin Tool Co.*, 1859 E. 63rd St., Cleveland. The fuel, stored preferably underground, is pumped to the producer unit where gas is generated by forcing air at a controlled rate of flow through a fixed amount of fuel. Gas is produced at a rate and amount, when and as required, to supply the demand of connected heating appliances. The machine is completely automatic, gas generation starting and stopping in volume directly proportionate to its use. Air is supplied automatically at a constant pressure regardless of



volume required. Fuel is supplied the producer as required by the use of gas, automatically maintaining the correct fuel-oil volume relationship at all times. Air and fuel motors are protected by overload and low voltage switches. The gas producer is built in one size, 23 in. diam x 44 in. high. It has a gas producing capacity of 300 cfh. The gas produced has a heat value of approximately 3800 Btu per cu ft. The fuel is non-asphyxiating, non-poisonous, and odorless normally but tainted for identification.

Carbide Tipped Center Punch

AN automatic center punch for glass and hardened steel, having a cemented carbide tip, has been marketed by *Vinco Products*, 326 Bond St., Asbury Park, N. J. It is reported that 1000 holes may be punched in steel of Rc 60 hardness before the point need be sharpened. The marker is 4 in. long, weighs 1½ oz, and contains a spring-actuated hammer tripped by pressure on the punch. Pressure of the spring may be adjusted to 8 to 20 lb by means of an adjusting screw. A shock absorber action permits adjusting the blow so that glass and light gage metals can be center-punched for subsequent operations without shattering or distorting them.

Shim Sets

STANDARD sets of shims in any shape of any size with any arrangement of bolt holes are available from *U. S. Gasket & Shim Co.*, Hudson, Ohio. Each set consists of one 0.020-in. shim, three 0.005-in. shims and three 0.007-in. shims. Individual shim sets provide for unlimited arrangements of thicknesses and are fabricated of steel, copper, brass, Monel and other ferrous or nonferrous material. Individual shims can range from 0.001 to 0.25 in. in thickness and overall shape sizes from ⅜ to 6 ft. Tolerances are held to 0.015 in.

Back-Geared Punch Press

WITH back gearing, providing a slower stroke with heavy punching tonnage, a new model punch press of 56-ton capacity has been announced by *Diamond Machine Tool Co.*, Los Angeles 23. The press has been designed to strain gage analysis, equalizing stresses uniformly throughout the frame, which is cradle mounted and may

be inclined up to 35° Inclining or raising the frame is performed from front or rear by one man. A foolproof non-repeat trip mechanism is simple and positive in action. Standard stroke measures 3

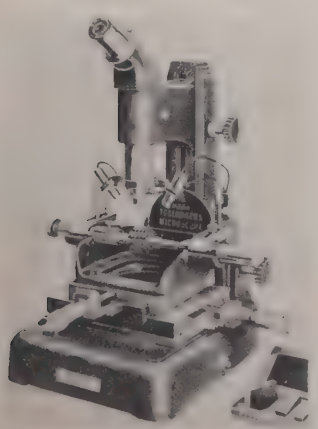
in.; maximum stroke to order, 8 in.; strokes per min, 50; bed area is 21x30 in.

DC Relays

UTILIZING double-break, silver-to-silver contacts, which are readily converted from normally open to normally closed without additional parts or tools, two dc magnetic multi-pole relays have been added to the line of machine tool controls manufactured by *Square D Co.*, 4041 N. Richards St., Milwaukee 12. Long mechanical life is achieved through straight line vertical solenoid action which minimizes the effects of shock and vibration. The relays are steel panel mounted and insulated to permit direct mounting on a grounded metal panel. All terminals are accessible from the front, and equipped with two wiring clips to accommodate multiple connections. Types Q and R are available with 2 to 6 poles and 2 to 5 poles, respectively. Both relays are suitable for operation on dc voltages up to 250 v.

Toolmakers' Microscope

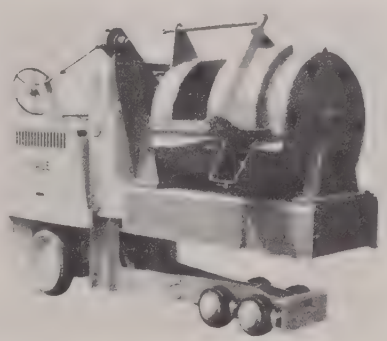
THE Wilder toolmakers' microscope, marketed by *George Scherr Co.*, 200 Lafayette St., New York 12, is a low-priced instrument consisting of a heavy Meehanite base and post, on which the Meehanite microscope bracket is vertically adjustable by spiral rack and pinion. The microscope tube provides a standard magnification of



30X for the image of the work. To facilitate thread checking, the vertical post with microscope and bracket may be tilted to the helix angle of thread. The work is either laid on the compound measuring stage or held in a center cradle that attaches to it. Measurements in two directions are by 1-in. heavy type micrometer screws that read directly in 0.0005 in. Longitudinally, a total range of 2 in. is provided. The standard equipment incorporates understage illumination for shadow images and surface illumination for reflected images.

Foundry Transfer Ladle

FOR lift-truck manipulation of molten metal in a foundry, *Yale & Towne Mfg. Co.*, Philadelphia, has developed a rotating transfer ladle attachment capable of receiving 3 tons of molten metal directly from the mixing ladle at the cupola, following the ladle lift up and down as the pouring proceeds, transporting the loads to the pouring ladles at the various casting stations, and



filling them as required. The entire operation is performed by one operator who rides the truck and controls all movements from a single position. The basic truck is an electric powered 8000-lb high-lift platform type with six steering wheels, for even load distribution and minimum turning radius. The ladle, lined with refractory brick, is permanently mounted on a heavy fabricated skid engaged by the platform of the truck and anchored to it. Rotation of the ladle is hand controlled from the truck driving position.

Tube Deburring Machine

A MANUALLY operated, bench type tube and rod end-finishing machine, embodying a mechanical chuck and chuck closing mechanism that positively holds any length tube, pipe or rod up to 2 in. diam, is offered by *Pine Engineering Co.*, Aurora, Ill. Deburring, chamfering, and facing can be completed separately or simultaneously in a single pass of the machine. It is possible to deburr, chamfer, and face tube and pipe ends, or to center-drill or form rod ends at the rate of 500 to 1000 per hr. Produc-

tion depends upon the size and length of the stock, cut taken, and the material. Change of cutting tools and inserts for various operations requires approximately 1 min. The tool holder is slotted to receive three cutters.

Condenser Tube Brush Cleaning

A BRUSHING technique for cleaning steam condenser tubes has been developed by *West Penn Power Co.*, Pittsburgh, and *Osborn Mfg. Co.*, Hamilton St., Cleveland. Cleaning the steam condensers involves the use of specially designed nylon brushes approximately 4 in. long and ranging from ¾ to 1 in. diam, depending upon the ID of the tubes. A special cone-shaped steel washer, slightly smaller than the ID of the tube, is welded to the wire stem at the trailing or pushing end of the brush. The brush is placed in the end of the tube and shot through the tube by water at 200-lb pressure delivered by a specially-constructed, nozzle-like gun. The brushing method rids the tube of mud and slime, and brushes off and washes out all algae.

Work Supports

TO provide quicker and more efficient operation on certain types of lathe work, a De Luxe type follower-rest and center-rest have been developed by *South Bend Lathe Works*, 381 E. Madison St., South Bend 22, Ind. Wrenchless adjustment and locking of the jaws are features of the tools. Each jaw has a knob for adjusting the jaw position, and a thumb screw for locking. Each revolution of the ad-

justing knob provides approximately 3/16 in. jaw movement. Jaws are made of brass and slide through precision steel sleeves which are pressed into the supporting frame. Both follower and center-rest are available for South Bend lathes.

Emulsion Cleaner

AHCOloid emulsion cleaner has been developed by *Apothecaries Hall Co.*, Waterbury 88, Conn., to replace hydrocarbon and chlorinated solvents. It can be used on all metals, including buffed zinc-base diecastings or aluminum parts. The cleaner has special surface active agents which impart to it a high degree of emulsifiability, wetting and penetrating action, and rapid rinsability. It is classed as a safety solvent with a flash point of 100°F. Operation is at room temperature and steel tanks are used for the cleaning procedure, which involves immersed agitation, followed by a water rinse. If the work is to be plated, a light alkali cleaning is necessary.

Water Displacing Products

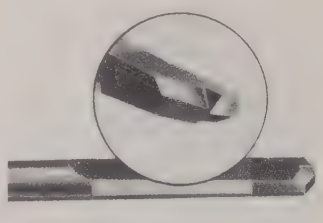
TWO water displacing products announced by *Metal-Clean Solvent Corp.*, 1935 N. Paulina St., Chicago, produce a moisture-free surface on ferrous and nonferrous metals, lifting water droplets instantaneously and leaving a protective film on the work, it is reported. Water thus displaced drops to the bottom of the tank where it can be drawn off. Fingerprints are neutralized and water stains prevented. Metal-Clean No. 11 is used as a cold dip and requires no further blending, agitation, or control. Metal-Clean No. 12 is a water displacing type of rust preventive, especially designed for work which is to be held for storage. It is applied by cold dip, brush, or spray.

Graphitized Lubricants

TWO graphitized lubricants known as Miracle Power and dgf-123 have been announced by *AP Parts Corp.*, Toledo. Miracle Power is used in motor oils and gasolines, while dgf-123 provides a dry graphite prelubricant for application to engine parts before assembly. In Miracle Power, synthetic colloidal graphite is suspended in a fine grade of pure, light petroleum oil. The dgf-123 is a concentrated dispersion of colloidal graphite in alcohol and carbon tetrachloride. It is intended for use only as a pre-lubricant of parts before assembly. When used as directed, either of the two lubricants gives metal surfaces a thin graphoid film.

Drill for Hardened Steel

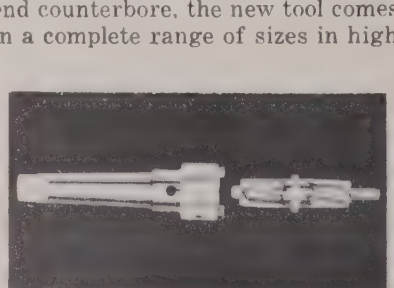
A CARBIDE drill for drilling high-speed steel at 66 Rc hardness has been announced by *National Tool Salvage Co.*, 6511 Epworth Blvd., Detroit. The drill is



specially ground which results in faster cutting and less heat. Holes 1 in. deep can be drilled in as little time as 60 sec with negligible wear on the drill, it is claimed.

Double End Counterbore

A COUNTERBORE, with cutting edges at two ends is announced by *Plan-O-Mill Corp.*, 1511 E. Eight Mile Rd., Hazel Park 20, Mich. Called the Plan-co double-end counterbore, the new tool comes in a complete range of sizes in high



speed steel or with tungsten carbide inserts. Both single and multi-diameter styles are offered with or without pilots. Collet and sleeve holders provide fast and easy tool replacement and furnish a positive drive with runout of less than 0.002 in.

Exterior Enamel

SUITABLE for factory-finishing over aluminum and resistant to outside exposure, a synthetic heat-hardening low-gloss enamel ha been developed by *Sherwin-Wi liams Industrial Div.*, 101 Prospec Ave., N.W., Cleveland. Tests hav shown the finish to be resistant t 2000-hr accelerated weatherometer exposure and 1500-hr salt spray ex posure. It also has withstood 5 cycles of a heat and cold test durin which there was noticeable expan sion and contraction of the alumi num base. After surface prepara tion, the aluminum may be rolle coated with primer and baked, the fabricated and sprayed with th finish bake coat. Or, both th primer and finish coat may be ap plied after the metal has been fab ricated.

Sapphire Balls

SYNTHETIC sapphire balls po ished to a sphericity of les than 10/1,000,000 in., unaffected b acids and with a hardness secon only to diamond, are being pro duced by *Linde Air Products Co* unit of *Union Carbide & Carbo Corp.*, 30 E. 42nd St., New York 1 Aging and creep phenomena do no appear in sapphire balls. Applica tions of these low-friction, chem cally inert and heat-resistan spheres to specialized problems i engineering and chemical processe are unlimited. Experimentation ha shown that sapphire balls are use ful for many high-temperatur bearing assemblies and for bearin installations subject to contact wit chemical agents. Clear sapphir balls are offered in limited quant ties in the following sizes: 1 mm 1/16, ⅛, and ¼-in. diam.

Tinning Pencil

RUSTPROOFING metal, rega vanizing spots, tinning bea ings, and other tinning operation can be done with the Kromove touch-up pencil developed by *Al State Welding Alloys Co., Inc.*, 9 W. Pond Rd., White Plains, N. Y It will tin oil-impregnated bronzes burned cast iron, stainless stee and black iron without removin mill scale. Oil and dirt must b wiped off. The surface tinned wi be good for soldering but darke than if the metal had been groun down beforehand. Dismantling i usually unnecessary for applyin the pencil. It can be applied wit oxyacetylene, airacetylene, or cit gas flame, melting at 450°F.

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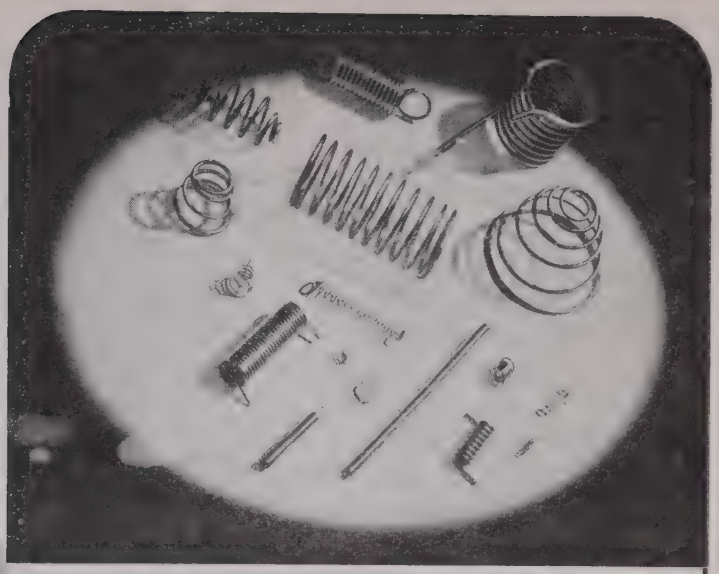

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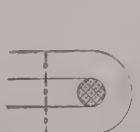
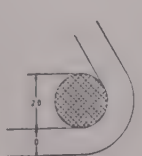


STM Bend Test Requirement for Grade A hosphor Bronze Spring Wire is only 120° nd around *twice* the wire diameter.



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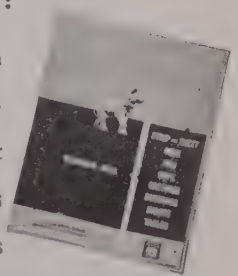

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Assembly Line . . .

WALTER G. PATTON

• Studebaker strengthens its hand in the truck field . . . New Jeepster will be introduced in July . . . State police move in on Chrysler strike . . . GM Truck opens a new engine plant.

DETROIT — The truck field continues to attract car producers and Studebaker expects to win a firm foothold in this market with its new line of trucks. The new trucks are being introduced at dealer meetings throughout the country. Additions to the present Studebaker line of trucks include a 2-ton model, a 1½-ton 171-in. wheelbase model designed to take a 14 or 15 ft body and a ¾-ton truck.

Attractively styled but utilizing a minimum of chromium trim, the trucks have been designed to give improved accessibility and driver comfort. Some emphasis has also been given to design innovations that simplify assembly operations.

The new cabs are lower and several inches wider than the earlier models. The new frame is heavier and has a minimum of three box-shaped cross members to give added stiffness and strength. All electrical accessories are easily accessible from beneath the hood. The radiator supports are constructed so that the radiator core can be removed for servicing simply by removing six bolts, disconnecting the water hose and tilting the radiator forward.

Running boards have been taken inside the cab which is fitted with many passenger car items including double windshield wipers, sun visors, arm rests, an ash tray and a reading light that operates automatically when the door is opened. Doors are double-sealed against weather and the revolving-type self-adjusting door latch used in Studebaker's passenger car line is specified.

An extension to the clutch pedal enables the driver to press the starter by depressing the clutch the full distance. The starter button can also be operated separately if desired.

Window openings are substantially larger than the earlier models, having 23 pct more glass area. The windshield is the divided type.

A new technique is utilized in assembling the hood and fenders. In place of 14 stampings formerly used, only four stampings are now being used, according to Studebaker engineers. The front fenders, grille and hood are now being subassembled as a unit and lowered into position as the new trucks come down the line.

The new Studebaker radiator grilles are made of a single steel stamping. Instead of chromium plating, the stamping is painted all over with ivory paint; the matching color of the truck is then added with the ivory showing through at the grille opening. In the heavier truck models, the bumper is painted rather than plated. Chromium plated bumpers continue to be used on the lighter models, however.

The entire area surrounding the engine has been insulated to resist heat and vibration. Inner door panels are painted metal rather than fibre board of artificial leather that is sometimes used.

A new device operates automatically to correct the speedometer when the two-speed axle is being used. Hardware is somewhat heavier than was formerly employed. An air silencer for the carburetor has been added on some models.

While the smaller models are somewhat heavier than the earlier trucks the new heavy duty models weigh about the same as their predecessors.

The new trucks are being built in the air conditioned plant used to produce aircraft engines at South Bend during the war.

* * *

DURING July Willys-Overland will formally introduce its new sport phaeton, the Jeepster. Assembly operations of the spor little convertible models with manually-operated top begins th month. By mid-July it is expect that all Willys dealers will stocked with the latest Willys-Ove land version of the wartime Jee

Production schedules call f completion of between 15,000 a 20,000 Jeepsters by the end of t year. The new models will ha 104 in. wheelbase for which stampings will be made in the ne Willys-Overland press shop. T Jeepster is powered with a 4-cyli der engine and comes equipped wi overdrive. The new cars are e pected to average about 25 mil per gallon under normal drivi conditions.

Introduction of the new Jeepst marks another step in Willys' we integrated program to elimina the frills from motor cars a stress economical operation. contrast with many other car signs, most of the gadgets a eliminated from these mode Willys engineers claim the desi of the manually-operated top such that one-man operation easily accomplished.

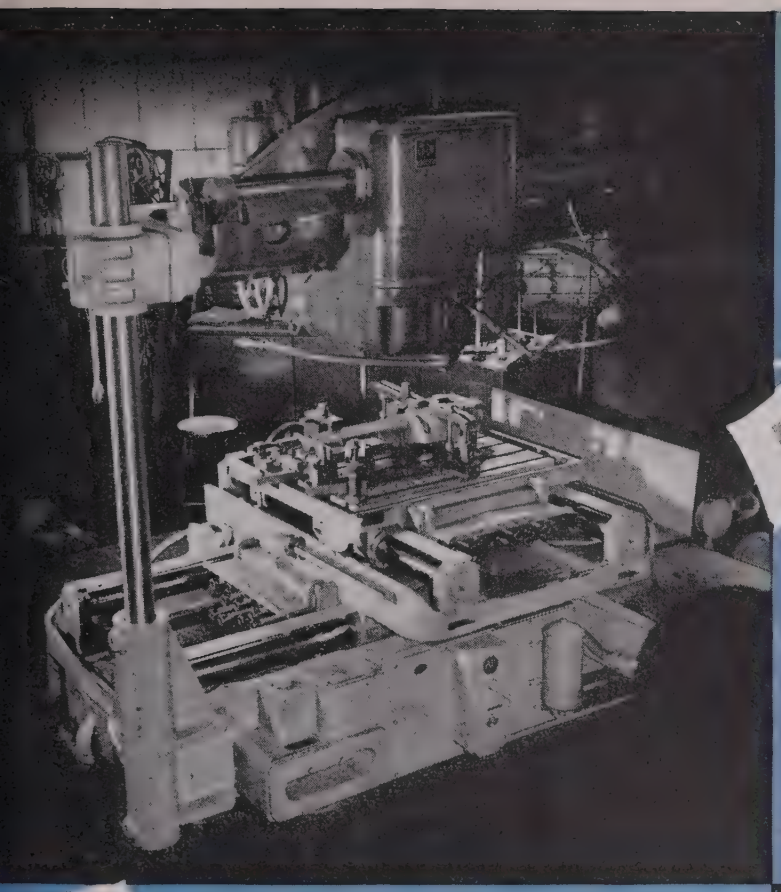
Willys' progress with its Jeeps will be watched with interest the rest of the industry which h consistently maintained that t motoring public wants big cars a fancy cars with lots of gadge The Jeepster is priced at $16 f.o.b. Toledo.

* * *

TO familiarize the employe with the company's position the current strike, Chrysler Co sent out a letter to all employe Among other things, the compa pointed out that a strike does body any good, that everybody s fers including employees, th families, the company, the deal and the company's customers.

Chrysler's explanation for meeting the union demand of wage increase of 30¢ an hr is teresting: "They (the union) h simply not persuaded us that wage increase at this time benefit anyone."

The letter then went on to ar that the two previous rounds wage increases failed to help purchasing power of the worke The letter continued, "In the most of us were worse off than were before. The same theories



PRODUCTION NEWS ABOUT BULLARD MAN-AU-TROL SPACERS

1.

HERE'S HOW ONE LOOKS IN ACTION AND WHAT THE USER SAYS

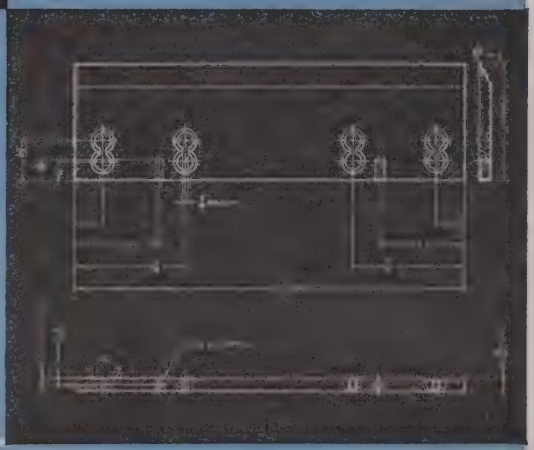
This is a BULLARD 30"x20" Man-Au-Trol Spacer being used by Kearney & Trecker, Milwaukee, Wisconsin with the following reported results: "We find that on parts where we do not have fixtures, the saving is considerable. We find that due to accurate positioning, we get more accurate work. We also find new uses every day; uses which we never thought of when we purchased the equipment".

HERE'S WHAT TWO OTHERS HAVE DONE

2.

AT HEPPENSTALL COMPANY, PITTSBURGH... PRODUCTION TIME CUT BETTER THAN 36%

Drilling and countersinking 13/16" diameter holes in this chipper knife used to take 95 minutes per piece for layout and drilling. The same job done with a BULLARD 30"x20" Man-Au-Trol Spacer, including setup time, takes only 60 minutes. According to C. W. Heppenstall, Jr., vice-president of this progressive firm, this new hole-locating method is "a real advancement in the science of metal working".



HOW MUCH CAN YOU SAVE?

Your first step toward learning how much you, too, can save in production time, jig fabrication and worker fatigue is to write for the latest Man-Au-Trol Spacer Bulletin. THE BULLARD COMPANY, Bridgeport 2, Connecticut.

BULLARD
MAN-AU-TROL
MASTER OF THE MACHINE

3.

AT R. HOE & CO., INC., NEW YORK CITY... OVER $2500 IN JIG FABRICATION SAVED IN 3 MONTHS

This maker of fine printing presses *not only* saved time on every job handled by a BULLARD Man-Au-Trol Spacer *but also* eliminated 75 hole-locating jigs in three months for a total saving of $2500 to $3000. Officials of R. Hoe & Co., Inc. further report that plans for constructing one of the world's largest presses for the Philadelphia Inquirer will require practically no jigs because of the use of the BULLARD 30"x20" Man-Au-Trol Spacer.

BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

being advanced now in support of a third round," the letter said.

In its letter Chrysler confirmed the report that its offer of 6¢ an hr increase was rejected by the union. The letter also set forth that the union had reduced its original demand of 30¢ to 18½¢ per hr.

Of the 75,000 Chrysler workers unemployed at present, all but 10,000 work in the Detroit area. Many unionized office and administration workers are reported to have joined the men and women on the picket lines. Some sources are predicting that 100,000 more workers may be idled as the effects of the strike mushroom throughout the industry.

Meanwhile, action against the strikers who are charged with violating Michigan's Bonine-Tripp Labor law was ordered by the Attorney General of Michigan to test the constitutionality of the new law.

One ironic incident has highlighted the strike thus far. On his recent visit to Detroit, Henry A. Wallace, the presidential candidate, joined the picket line in an open bid for support of the United Autoworkers. Mr. Wallace has previously been denounced by Walter Reuther, president of the UAW-CIO, as a tool of the Russians. His third party is openly opposed by the UAW-CIO.

Using his best political manner, Mr. Wallace told the pickets over the loudspeaker that their wage boost could be won without higher automobile prices or seriously impaired profits for management.

After addressing the picket line, Mr. Wallace is said to have handed the microphone to a nearby picket who promptly invited the crowd to join him in singing, "I Had a Dream, Dear." He didn't complete the song but the incident furnished an amusing topic of conversation in Detroit on the eve of Mr. Wallace's recent speech at Olympia stadium.

Following the outbreak of fisticuffs at the Chrysler Highland Park plant, Michigan State Police have been ordered to patrol some of the plants to maintain order. The troops have been ordered in by Gov. Sigler. State intervention had been requested by Mayor Norman Patterson of Highland Park after 15 Highland Park patrolmen were roughed up in a near riot at the Oakland Ave. entrance of the plant.

This is the only picket-line flare-up thus far but the underlying strong feelings of the hot-heads of the union make it strongly advisable to maintain adequate police protection at all times.

It is hardly likely that Ford's recent demand for what amounted to a wage cut and the impasse reached in the GM negotiations will make disgruntled union members any happier. Talk of a GM strike is already being heard but most sources believe the calling of a GM stoppage is not likely except as a desperation move by union strategists.

* * *

FINDING a solution for its steel problem has made quite a difference in Packard production. During the first 4 months of this year and despite the loss of 14 working days in January and February because of the industrial gas shortage, Packard assembled 27,200 units compared with only 16,025 units produced in the same period a year ago.

During April Packard hit a new postwar production record for the second consecutive month and seemed well on the way to another production peak in May. The Chrysler strike is not expected to interfere seriously with Packard production. Incidentally, Packard is also reporting substantial profits at today's operating rate, netting $1,304,727 in the first quarter compared with a loss of $1,148,173 for the same period last year.

* * *

June 13 has been set as Ford family day when more than 100,000 Ford employees and their families will preview the new 1949 Ford automobiles. A similar showing was held at the Lincoln-Mercury plant recently when these cars were introduced. Ford officials have reported a very satisfactory response to this program which they feel gives employees an early opportunity to show off the cars to their families.

Similar programs will be held at Ford branch assembly plants. There will be rides in the new cars, souvenirs for the children and refreshments for everybody. Ford branch plants are located at Atlanta, Buffalo, Chester, Pa., Chicago, Dallas, Edgewater, N. J., Kansas City, Long Beach, Louisville, Memphis, Norfolk, Richmond, Somerville, Mass. and St. Paul, Minn.

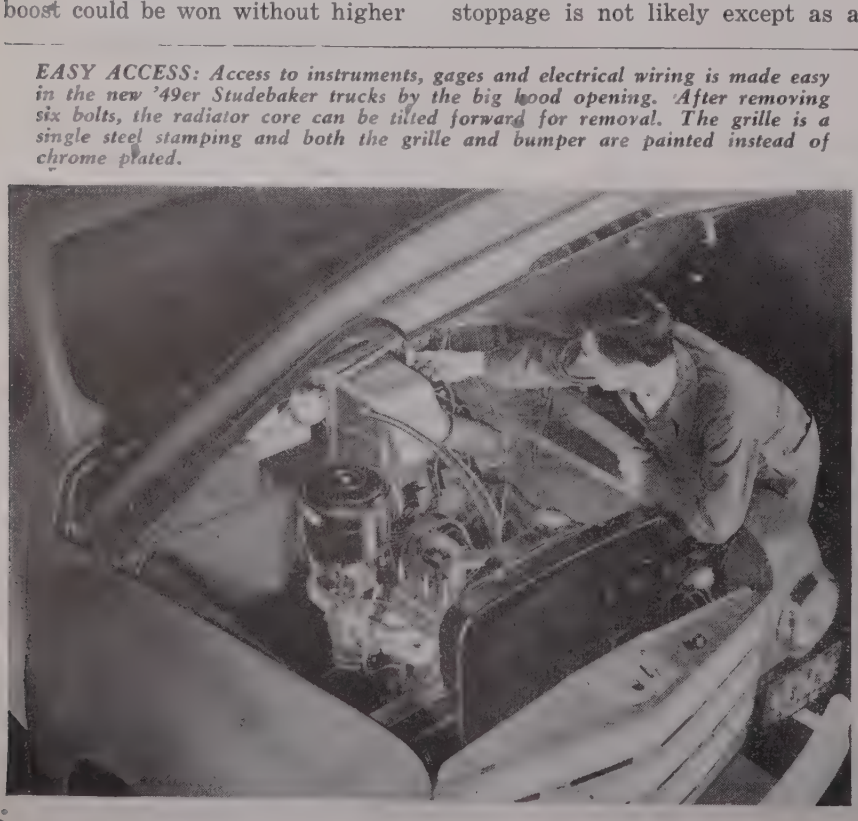
* * *

GMC Truck & Coach Div. is now operating two engine assembly lines, one for large engines, and another for small engines, at its new plant on South Blvd. in Pontiac.

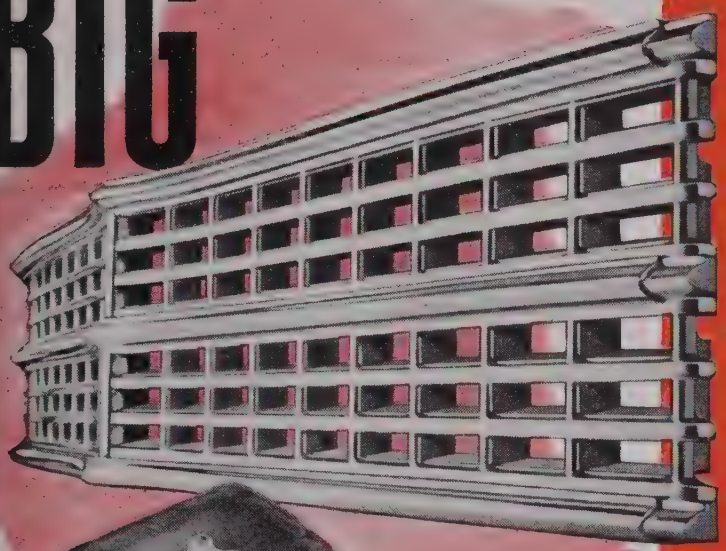
All engine assembly and machining of all parts are performed in this plant which currently employs 900 workers. Present production is about 500 engines per day.

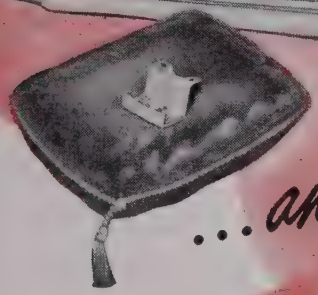
The new plant is completely modern from a standpoint of lighting, conveyers, hoists and other material handling devices.

EASY ACCESS: Access to instruments, gages and electrical wiring is made easy in the new '49er Studebaker trucks by the big hood opening. After removing six bolts, the radiator core can be tilted forward for removal. The grille is a single steel stamping and both the grille and bumper are painted instead of chrome plated.



BIG





...and small

• **From small precision-made parts to massive radiator grilles in glittering chrome, Auto-Lite's die casting research and experience is helping industry develop a wide variety of new products. Through its "Controlled Metals" inspection processes, plus the finest production equipment and methods, Auto-Lite is able to assure manufacturers beauty, strength and accuracy on every type of job.**

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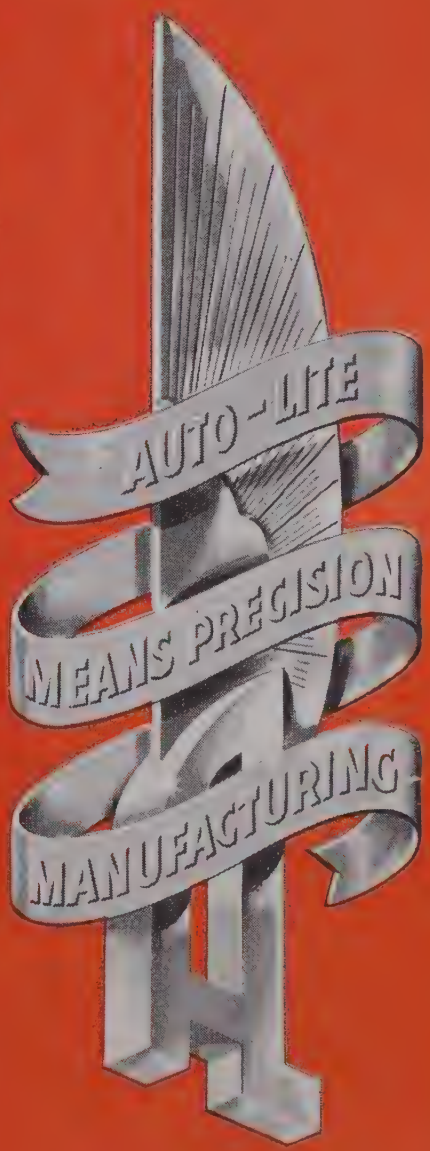


CASTING, MACHINING, FINISHING
AND PLATING OF ZINC
AND ALUMINUM DIE CAST PARTS

DIE CASTING *by* Auto-Lite

Tune in the Dick Haymes Show for Auto-Lite
Thursdays, 9:00 P.M.—E.T. on CBS

Washington . . .

EUGENE J. HARDY

• Administration set to try again on controls . . . NSRB plan rejected . . . Trade associations on the griddle . . . Mr. Mason analyzes basing point decision.

WASHINGTON — Despite continued rebuffs from Congress on the question of production, wage and price controls the Administration last week was getting set for another try. The executive departments have been busy accumulating data for the White House to justify a new stand for measures to control the nation's economy.

The new approach reportedly will emphasize the inflationary aspects of national defense plans, and, more important, the need for meeting production schedules for munitions items.

A preliminary report of the National Security Resources Board which calls for emergency standby powers is reported to have brought about this new phase in the battle for controls. NSRB wants standby powers to control the entire economy and wants to see itself in the driver's seat as the master control agency. The report was authorized by Ferdinand Eberstadt, New York banker and former WPB official who now holds a top job on the NSRB staff.

While NSRB will not comment on the report it is a well-known official secret that the President tossed it out on the grounds that it was too broad and had no chance of getting through Congress.

THE NSRB plan is described by officials who have studied it as "ambitious beyond verbal description." The Cabinet was particularly vehement in denouncing this grab for power. The Commerce Dept. led the objectors, since this agency would like to have a direct hand in administering any control legislation that might be enacted. Commerce now administers the remnants of the Second War Powers Act, covering tin, antimony, and quinidine and has a working nucleus of former WPB officials in its voluntary allocations division—the Office of Industry Cooperation.

After rejecting this plan, the President is reported to have ordered several executive agencies, notably the Commerce Dept., to make a new analysis of industrial resources and the demands now facing the economy in order to determine whether any immediate controls are needed as contrasted with a long-range standby proposition. He is expected to come up with a new plea for controls before Congress adjourns next month.

On Capitol Hill, Republican leaders still maintain an "over my dead body" attitude in regard to full controls, despite the fact that several isolated converts have been won over as a result of the steel industry's refusal to allocate steel to metal prefab house producers and the slowness with which a voluntary allocations agreement for the petroleum industry is proceeding.

* * *

REPRESENTATIVES of trade associations are quietly pushing legislation which they hope will strengthen the research and development functions of their organizations.

Trade associations, particularly those engaging in publishing price data for their member firms, are anxious to prove to Congress and to the executive branch of the federal government that their primary reason for being is to carry on research and development activities.

To this end, legislation (S 2673, HR 6496) sponsored by Senator Flanders, R., Vt., and Representative Keating, R., N. Y., would grant a federal charter to the America Standards Assn. and would therel permit agencies of the federal go ernment to participate in ASA r search in standardization.

The Flanders and Keating mea ures are currently under study b the Senate and House Judicia Committees. But barring unfor seen energy on the parts of th proponents of the bills to force d bate and vote, the measures a likely to remain under committ study until the end of the prese session of Congress.

Basically, ASA activities in th field of standardization are but extension of the program launch more than 20 years ago by Herbe Hoover, acting as Secretary Commerce. ASA today is a feder tion of 72 technical societies, tra associations, and government agencies. There are, in additio 35 associate members and mo than 2,000 company members w supply the bulk of ASA's financ support.

Trade association executives a particularly concerned, however, the recent remark of Federal Tra Commissioner Lowell B. Mas that "if the laws stand as they a now, I predict trade associatio are out."

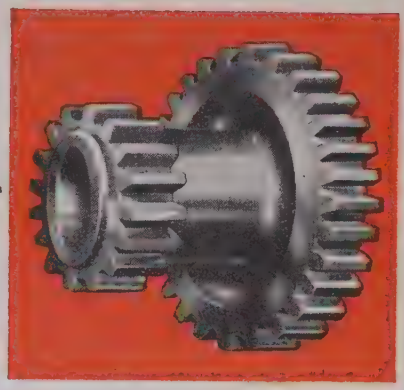
Mr. Mason, a Republican, is ge erally regarded as one of the mo literate bureaucrats in the feder government.

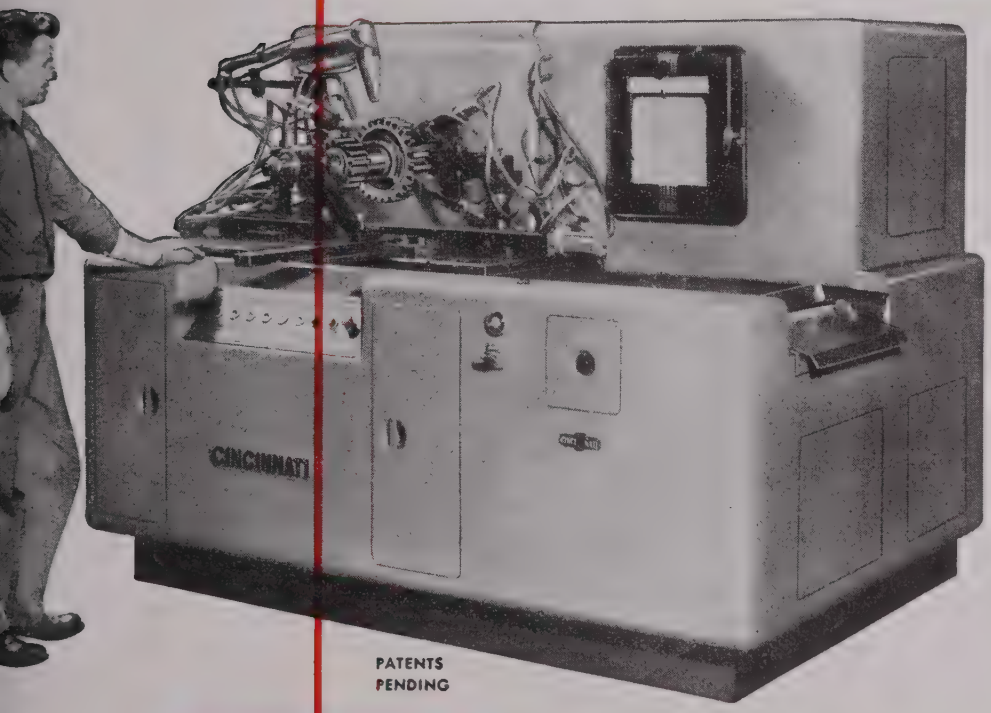
In a speech before the Marketi Club of Harvard University's Gra uate School of Business Admin tration, Mr. Mason said the "pre ent administrative trend will ma life so uncomfortable for membe of associations that the hazards membership will hardly be wor any legitimate advantages."

COMMENTING on the rece Supreme Court decision whi ruled out the use of basing poi in the cement industry, Mr. Mas said he believed that the multi basing point pricing system is "c as a matter of law," and that it also "out as a matter of plain ec nomics."

"I think there are more busine men in this country who would w come a mill base at every point

1 of 40 parts...





PATENTS PENDING

Length:	12"
Pitch diam.:	5.333 and 9.333
Diametral pitch:	3/4"
Material:	Cast steel alloy (.40-.50 C; .90-1.10 Mn; .55-.65 C
Surface hardness:	up to 50 Rockwell "C"

. . . Flamatic hardened at substantial savings over previous methods. Unit Crane & Shovel Corp. uses the Cincinnati Flamatic for surface hardening an unusually wide range of parts, and gets exceptional results. This 60-pound cluster gear, for instance, requires only a 6-minute cycle to harden the large O. D., only 4 minutes for the small O. D. Except for loading, operation is automatic and desired "physicals" are obtained uniformly, part after part.

High temperature flames heat the surface rapidly to within plus or minus 5°F of the desired preset temperature, at which instant the electronic "Eye," through relays, causes the part to be deposited in the oil quench.

Core properties: unaffected. Distortion: negligible. Work size capacity: gears, pinions, cams, etc., up to 12" diameter depending on width, shafts up to 18" long depending on diameter.

Unit Crane & Shovel Corp., for whom this machine was equipped with special (yet low cost) fixtures, writes: "Flamatic has been successful beyond our expectations . . . The reduction in our cost for this operation has been such that it has proven a very profitable piece of equipment." **Write today for complete 20-page catalog.**

THE CINCINNATI

flamatic

HARDENING MACHINE

CINCINNATI

production than there are businessmen who wish to maintain either the Pittsburgh-plus or the multiple basing point system," he declared.

Mr. Mason also expressed the opinion that under existing law freight absorption, zone prices, and an individual universal delivered price system are outlawed. "Government will probably first attack the pricing system of those heavy commodities where the freight is a large percentage of the cost of the article to the purchaser," he stated, listing the following commodities as examples: Iron and steel, lime, rubber, glass containers, builders' supplies, farm equipment, ice, road machinery, paint and varnish, business furniture, liquified gas, auto parts, ladders, paper and pulp, structural clay products, china and porcelain, reinforcing materials, vitrified clay sewer pipe, anti-friction bearings, wholesale food and grocery products, end-grain strip wood block, construction machinery, paper bags, lye, and wholesale coal.

Six predictions of things to come were listed by Mr. Mason: (1) Congress will never legalize any price-fixing system provided they know what they are doing. (2) Hereafter, anyone who wants will be able to take factory delivery on anything he wants to buy. (3) There will be a decentralization of users of basic products. (4) There will be an amendment to the Robinson-Patman Act so that the variances in profit or mill net will not be the earmark of discrimination. (5) Trade practice conference legislation will pass with even greater exemptions than those contained in the legislation I proposed before the American Bar Assn. in October 1947. (6) Unless there be changes in the present law, future court decisions will all turn to a further mechanization of the law.

Business Spending Shows First Quarter Increase

Washington

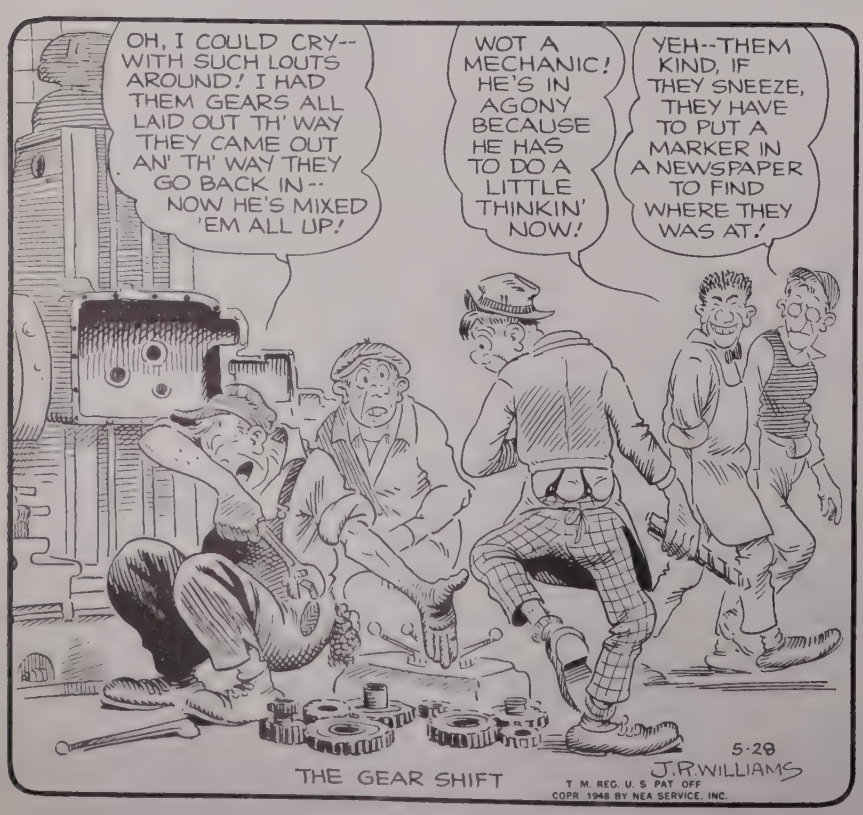
• • • **Business spending** rates during the first quarter of 1948 increased sharply, rising from $30 billion to $36 billion, according to Office of Business Economics data. The bulk of the boost, however, went into accumulation of inventories, mostly at the trade level.

On the basis of first quarter fi ures, the gross national produ rate stands at $244 billion, a ri of $3 billion over last quarter 194 It is broken down into $173 billio for personal consumption expend tures, $40 billion for domestic an foreign business expenditures, an $31 billion for government spen ing.

Personal consumption spendin rates increased by about $700 mi lion for the quarter but a surve reveals that the increase is almo entirely due to higher prices rath than greater volume of goods pu chased. Personal income is no estimated at about $209 billion, i cluding $135 billion in salaries an wages.

Government's annual spendin rate rose $1 billion during th quarter and is attributed entire to increased spending for foreig aid. This may be expected to i crease sharply by the end of th third quarter, at which time th Economic Cooperation Administr tion expects to have its Europe aid program well under way.

THE BULL OF THE WOODS — BY J. R. WILLIAMS



Tinplate Authorized For Some Types Coffee Ca

Washington

• • • **Following consideration** an appeal filed by coffee packe changes in Conservation Order M 81 (tin cans), to permit use some tinplate in the manufactu of certain types of coffee cans, we announced by the Office of Dome tic Commerce, Dept. of Commerc

The changes will not result any additional overall use of ti and no increased allocations of t scarce metal for can making a contemplated since the amendme is permissive only, officials said.

The new specifications allow u of .25 lb tinplate in soldered welded parts of all sizes of cans f packing soluble coffee, to assu moisture-proof seams. Blackpla still must be used for other par

Use of .25 lb tinplate in 2-lb a larger sizes of cans for packi regular coffee also is authorized f the soldered and welded parts, wi use of blackplate still required f other parts. Coffee cans small than the 2-lb size still must be ma entirely from blackplate.

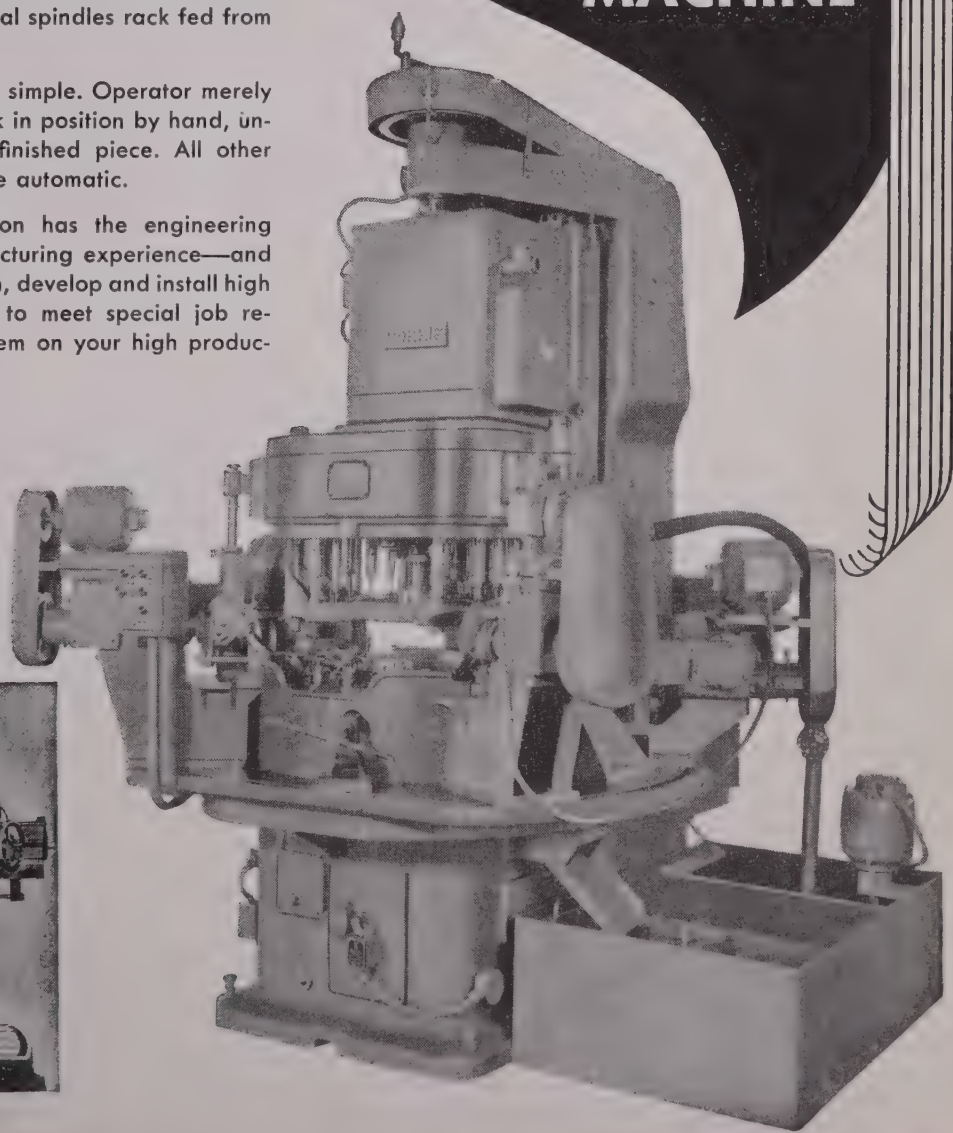
MORRIS
MOR-SPEED
Six-Station
Vertical Hydraulic
MACHINE

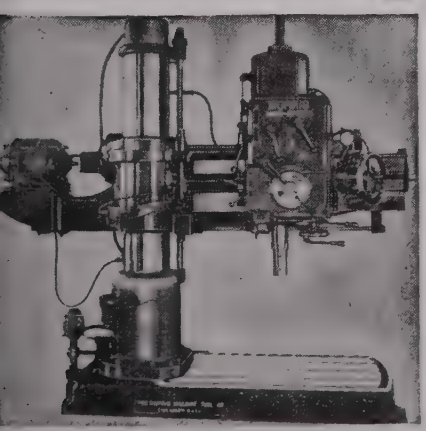
● To adequately handle the required production of a specific job, many manufacturers find Morris Mor-Speed machines not only capable of meeting production requirements but also exceptionally economical in operation.

An interesting example is the Morris machine shown. This vertical type machine, with hydraulic automatically operated indexing fixtures, drills — reams — counterbores — countersinks and chamfers holes in various positions in Refrigerator Compression Cylinder parts. There are thirty-one vertical spindles driven by a hydraulic unit and eight horizontal spindles rack fed from the hydraulic unit.

Operation is extremely simple. Operator merely loads and clamps work in position by hand, unclamps and removes finished piece. All other operating functions are automatic.

The Morris organization has the engineering "know how"—manufacturing experience—and shop facilities to design, develop and install high production equipment to meet special job requirements. Consult them on your high production jobs.





MORRIS MOR-SPEED RADIAL

Builders of MOR-SPEED Lines

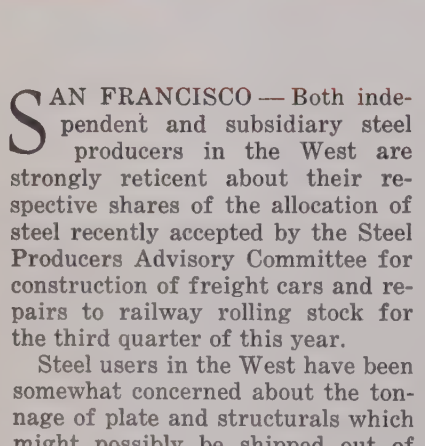
The MORRIS *Machine Tool Co.*

CINCINNATI 3, OHIO

West Coast . . .

ROBERT T. REINHARDT

• Steel allocation to rail car building program disturbs western users, while producers show reluctance to give details of participation . . . Boeing strike may test T-H law.



SAN FRANCISCO — Both independent and subsidiary steel producers in the West are strongly reticent about their respective shares of the allocation of steel recently accepted by the Steel Producers Advisory Committee for construction of freight cars and repairs to railway rolling stock for the third quarter of this year.

Steel users in the West have been somewhat concerned about the tonnage of plate and structurals which might possibly be shipped out of this trade territory to fulfill the promises made by the members of the advisory committee. So far as can be learned there is little cause for them to worry for at least 6 months since but little repair and construction work for railroads is anticipated during that period.

Only major construction program is that on the schedule of Pacific Fruit Express Co. which intends to start production of approimately 3000 refrigerator cars early in 1949 in its shops at Colton, Roseville and Los Angeles, Calif., for which it is estimated approximately 6000 tons of plates and structurals will be needed. Both the Southern Pacific and Western Pacific railroads deny that they plan any car building here in the West. The Southern Pacific Co. is having 1650 gondola cars built for them by Bethlehem Steel Co. at Johnstown, Pa. but no western steel is scheduled for this operation. These cars will be of 50 ton capacity, 41 ft long and of the drop-bottom general service type. Total order is valued at approximately $9 million.

Pacific Car & Foundry Co. at Renton near Seattle is engaged in a $4½ million program to rebuild 1000 refrigerator cars for delivery in the East. This operation entails construction from the sills and trucks upward. This operation is on an assembly line basis and at the peak eight a day will be produced. In addition Pacific Car & Foundry will begin construction on 20 all-steel cabooses for the Alaska Railway at an average cost of $11,000 a piece. Steel for these operations is reportedly coming largely from western mills.

Kaiser Co., Inc., Iron and Steel Div., admits supplying a portion of the plate and structurals being utilized in the national car building program but gives no specific figures. However, it is understood that this company has been asked to supply between 3000 and 4000 tons of plates and structurals for this program and most of that material will be scheduled for use in eastern plants.

COLUMBIA Steel Co., U. S. Steel Corp. subsidiary, likewise has not revealed its allocation on this program, but states that it is subject to dictation from the East in regard to quantity and grade and sizes. These withdrawals from production at Pittsburg and Torrance, Calif., are expected to be very small because the products rolled at these plants are readily available nearer the car builders in the East and freight cost on such shipments to the East would be excessive and can be more economically supplied by other U. S. Steel subsidiaries. However, there are rumors afloat, based on usually reliable sources, that in the overall program Columbia might be expected to supply as much as the Kaiser organiaztion.

Bethlehem Pacific Coast Steel Corp. reports that so far there have been no demands on the production facilities of that company here in the West and whatever allocation has been made to Bethlehem Steel Co. will be handled by eastern producers of the company.

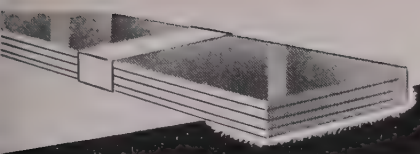
As was to be expected, the allocation of any material which will be used out of this region, has brought about criticism of the program by industrialists and this situation probably accounts for the refusal of steel producers to release figures on such shipments. Sales managers are already harrassed by the scarcity of those items needed for railroad car construction and do not relish further argument with would-be customers.

SEATTLE — As the strike of 14,800 members of Aaeronautical Mechanics Union (local 751, International Assn. of Machinists) against the Boeing Airplane Co went into its third week the situation shaped up as a major test of the Taft-Hartley Law, and the National Labor Relations Act.

In an attempt to settle the Boeing strike, Cyrus F. Ching, director of the Federal Conciliation and Mediation Service, invited both the company and union to send officials to Washington for conference. Boeing president William M. Allen refused to attend, saying, "If the purpose is to bring . . . collective bargaining negotiations," the company was not interested. However he added that the company would attend, "for the purposes of giving those present complete facts in support of our position that the strike is illegal."

The contention that the strike is illegal is based on Mr. Allen's claim that it is being conducted in violation of Section 8-D, of the National Labor Relations Act, which removes collective bargaining from union and its members in the event of an illegal strike. On these grounds, Mr. Allen has claimed that the union can no longer bargain with the company, and he has refused to meet with union officials.

Mr. Ching immediately wired back that the Taft-Hartley Law provides that employers and employees shall participate "fully and promptly" when the federal media



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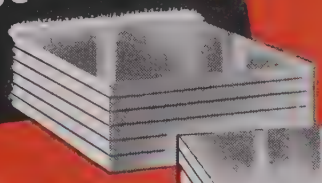

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. . . any selection of LYON standard products (see partial list below) at regular published prices . . .

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- Cabinet Benches
- Folding Chairs
- Drawing Tables
- Storage Cabinets
- Bench Drawers
- Work Benches
- Drawer Units
- Conveyors
- Shop Boxes
- Bar Racks
- Bin Units
- Tool Stands
- Service Carts
- Hopper Bins
- Parts Cases
- Flat Drawer Files
- Tool Trays
- Desks
- Stools
- Tool Boxes
- Sorting Files
- Ironing Tables

tion and conciliation service calls a meeting.

To this, Mr. Allen quickly replied by wire to Mr. Ching, that the meeting called by the director was in violation of the Taft-Hartley Act as it would "render meaningless the section of the law which protects an employer who is the victim of an illegal strike." Mr. Ching's policy, Mr. Allen stated would require the company to bargain with its illegally striking employees. Apparently that was enough for Mr. Ching as he sent Mr. Allen another wire stating, "The service does not have the authority nor the intention to compel the company to attend the meeting."

Earlier last week the Boeing Co. had filed suit against the local union and its International for damages caused during the strike, and stated the amount would increase if and as the strike continued.

The complaint filed in U. S. District Court, stated it was a suit for "violation of contract" under Section 501 of the Labor-Management Relations Act (Taft-Hartley Law), which makes unions responsible for their actions.

After 21 days of work stoppage the situation last week seemed as far from being settled as it was on the day the strike was called, so far as the union members are concerned. Just what the company's plan of action will be under the Taft-Hartley Law is now clear. At present no meetings are being scheduled with any bargaining agency, local 751 no longer has a contract nor bargaining rights, and the Boeing Co. is short 14,800 workers.

The company states that the plant is open and work is available for those who want it. Boeing officials claim they have received numerous phone calls from strikers wanting to get back to work, but whether they will cross the picket lines of local 751 remains to be seen.

IN odd contrast to the situation prevailing at the Boeing plant is the action taken recently by 8000 workers belonging to unions affiliated with the Seattle Building & Construction Trades Council (AFL) whereby they declined a 6½¢ per hr wage increase which had been assured them under a cost of living escalator clause.

The action was taken by the members of the affiliated unions because they "felt it was good business for the construction trades," according to Fred W. Smith, secretary of the council. Union officials pointed out that building cost has risen accessively and that people purchasing new homes and other construction are cost conscious and want to know what they are going to have to pay for their buildings before contracts are let.

* * *

ARRIVAL of approximately 15,000 tons of No. 1 heavy melting scrap from Adaka, Alaska, for delivery to Alaska Junk Co. is anticipated here with some relish by steel producers according to Harry Schwartz, company official. The material runs about 50-50 on prepared and unprepared.

This is one of the largest shipments to come out of Alaska and is scheduled for sale upon arrival.

Scrap continues to move into this area from other sources and mills have been able to build up small inventories against the rail strike which failed to materialize. Higher prices prevalent in this area this year are credited with bringing out more material and there have been but few complaints recently of shortages. Extensive ship-breaking operations in the Northwest are also credited with relieving the tight situation which prevailed 6 or 8 months ago.

LOS ANGELES—Belief that the same raw material standardization plan now in use by West Coast airframe manufacturers (THE IRON AGE, Apr. 29, 1948, p. 108) could solve many of the country's steel supply problems if adopted by other industries on a national scale was expressed here.

Glen Aron, head of Northrop Aircraft, Inc., engineering department and chairman of the West Coast standardization project of the National Aircraft Standards Committee, said that West Coast airframe factories are finding a successful solution to many of their steel supply problems through voluntary reduction of raw material varieties. Meanwhile most U. S. manufacturers are plagued by a chronic, prolonged shortage of steel.

Of the four materials covered by the standardization project—steel, stainless steel, aluminum, and magnesium—the greatest improvement in supply has bee nnoted in steel.

This improvement has been accomplished, Mr. Aron noted, despite the fact that steel was the most difficult of all the raw materials to standardize.

Typical of steel standardization problems was the necessity for settling on a single "gage standard" to be used in specifying thickness of sheet stocks. Investigation revealed countless "gage standards" were in use at the start of the project. By voluntary agreement, both airframe manufacturers and suppliers agreed to use a single gage standard, the American Standards Assn.'s B32,1 in specifying stainless steel sheets.

"If the airframe industry wishes further to improve the availability of steel there is a need for collaboration with other industries who use the same warehouses as a source of supply," Mr. Aron said.

"For instance, the petroleum industry has many problems in steel akin to those faced by airframe manufacturers. Both are concerned with the weight-strength ratios of steels. Suspending a string of tools down a hole a mile and a half deep is just as much a problem of metallurgical fatigue as is the design of supports for an aircraft engine," he pointed out.

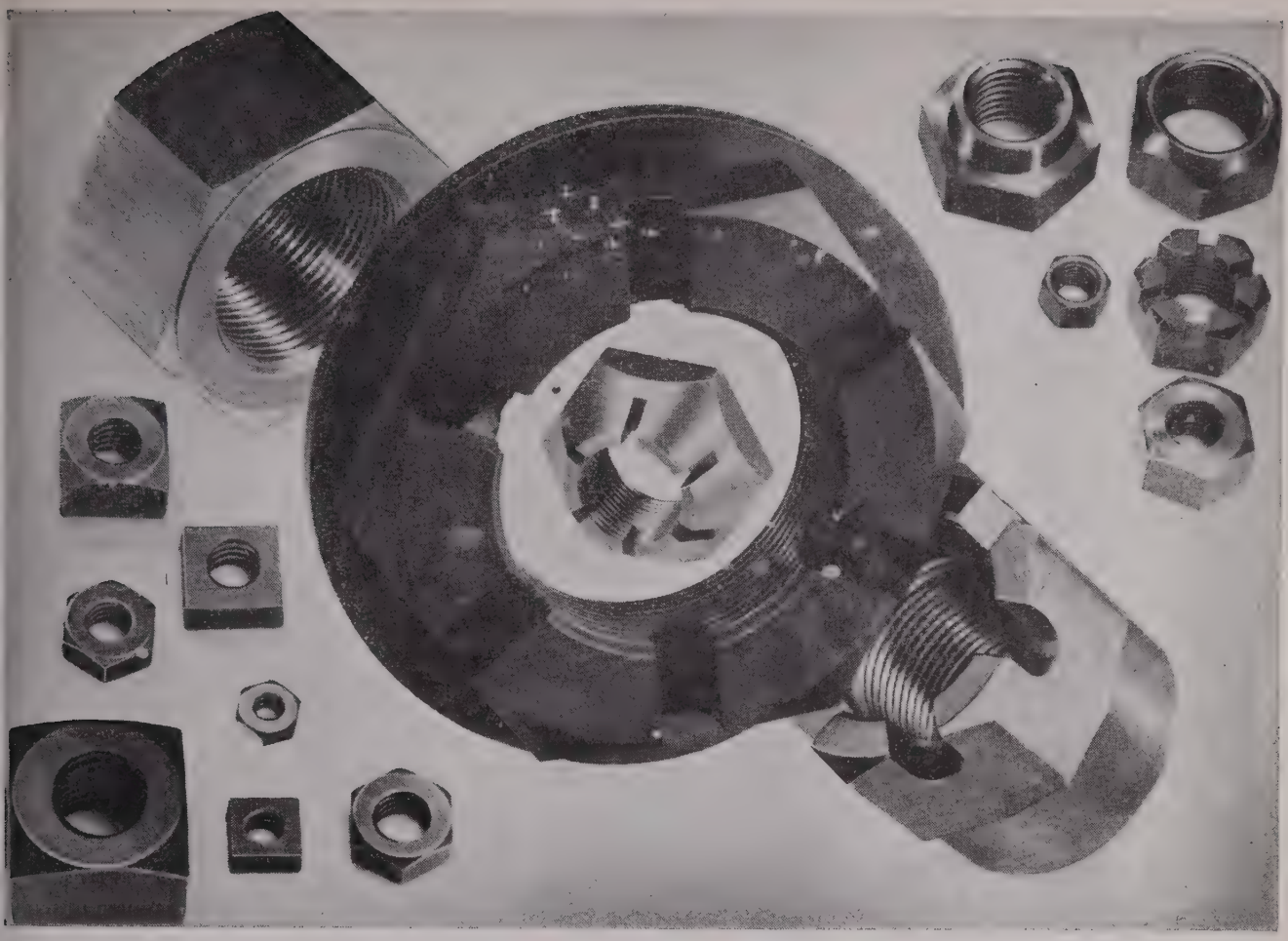
Suspension Likely For Scrap Import Duties

Washington

• • • **The House Ways and Means** Committee has reported favorably on the bill (HR 6242) to extend the suspension of import duties on scrap until June 30, 1949.

"Large quantities of metal scrap, much of which came from the U. S. in the form of military equipment, is still to be found in a number of foreign countries," Rep. Grant, R., Ind., told the House. "The demand for iron, steel, aluminum and other metals in the U. S. is perhaps even more acute than in 1947. The temporary extension of the free importation of these materials is therefore deemed advisable, both from a standpoint of national security and for the satisfying of civilian demand."

Final passage and approval of the bill by the President are considered certain.



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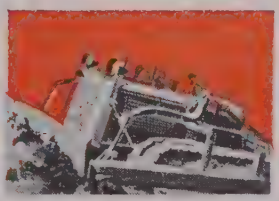
TIME—Holes repunched clean and true—tapped in latest-design tappers—insure accurate and uniform thread formation for quick run-on.



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DEPENDABILITY—The RB&W cold-punching process in itself insures a sound product, free from structural defect.

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103 Years Making Strong the Things That Make America Strong

PERSONALS

o o o

• **Forrest E. Richmond** has been elected vice-president of Revere Copper & Brass Inc., New York, and executive head of the company's Rome Div., Rome, N. Y. Mr. Richmond has been with Revere since 1908. He was formerly works manager of the Rome Div. **L. G. Glesmann,** assistant works manager of the Rome Div., has been appointed works manager there.

• **Curtis A. Gordon** has been named general works manager, Jessop Steel Co., Washington, Pa. He was formerly superintendent at the Colorado Fuel & Iron Corp., Wickwire Spencer Steel Div., Buffalo. He has also been associated with Bethlehem Steel Co., Canton Alloy Co., Donner Steel Co., Rustless Iron & Steel Co., and Crucible Steel Co. of America.

• **Frank G. Soule** has been appointed purchasing agent for the general engineering department of National Lead Co., New York. Mr. Soule has been purchasing agent at the Sayreville plant for the titanium division since 1934.

• **William C. Roederer** has been appointed district manager of American Car & Foundry Co.'s St. Charles, Mo., passenger car plant. He had previously been assistant district manager at that plant.

• **George P. Lacy** has been appointed manager railroad sales, Sheffield Steel Corp., with headquarters at Kansas City, effective June 1. He has been associated with Sheffield for 12 years. **George P. McCracken,** who has served under Mr. Lacy for the past 3 years, has been appointed district manager, San Antonio office, succeeding Mr. Lacy. **Ernest Baxter,** vice-president of Sheffield Steel, will retire from official status on June 1 after more than 30 years of continuous service. Thereafter he will function in a consulting capacity.

• **Thomas Nast** has been elected president and treasurer of Kensico Tube Co., Mount Kisco, N. Y. He was formerly associated with Revere Copper & Brass Inc. for several years.

• **Harry E. Thiele** has been elected vice-president—manufacturing of General Steel Castings Corp., Eddystone, Pa., to take the place of **Arthur R. Allard,** who has resigned.

• **Lawrence F. Black** has been appointed assistant chief engineer, American Steel & Wire Co., Cleveland. **Charles B. Hull** has been named assistant division engineer, construction. Mr. Black joined American Steel in 1924. Since 1945 he has been superintendent of engineering and maintenance at Duluth, which post he now leaves to assume his new duties. Mr. Hull started as a draftsman in the chief engineer's office in 1925. He was works engineer at the Cuyahoga works prior to his appointment in 1945 as chief draftsman in the engineering department, which position he has held up to the present time.

BURKE B. ROCHE, vice-president, Binks Mfg. Co.

• **Burke B. Roche** has been elected vice-president of the Binks Mfg. Co., Chicago. Mr. Roche, who has been with the Binks organization since 1939, was formerly in charge of the industrial division.

• **Irwin H. Cornell** has retired as vice-president and sales manager of the St. Joseph Lead Co., New York, after 38 years of service with the company. He will remain as a member of the board of trustees and of the executive committee. **Charles R. Ince** has been appointed sales manager to succeed Mr. Cornell. Mr. Ince joined St. Joseph Lead Co. in 1929 as assistant to Mr. Cornell.

• **R. M. Worth** has been made vice-president in charge of sales of the Worth Steel Co., Claymont, Del., to succeed the late Paul M. King.

• **James J. Ryan** has been appointed to the newly-created position of manager of gypsum, lime and steel products sales of National Gypsum Co., Buffalo. He has been with National Gypsum since 1934 as manager of metal lathe sales.

• **A. B. Vestal** has been appointed to the management staff of Firth Sterling Steel & Carbide Corp., McKeesport, Pa. He formerly worked as a power and fuel engineer at Jones & Laughlin Steel Corp., and during the past 8 years served as head of industrial engineering of both the Farrell and Duquesne plants of Carnegie-Illinois Steel Corp.

• **R. W. Roush** has been named chief materials engineer for Timken-Detroit Axle Co., Detroit. He has served as chief metallurgist since 1935. Mr. Roush will be responsible for all materials and processes and will direct the activities of all company laboratories. **F. E. Johnson,** for 5 years assistant chief metallurgist, has been appointed chief metallurgist of Detroit plants. He will be in immediate charge of Timken-Detroit metallurgical and chemical laboratories.

• **Charles R. D'Olive** has been appointed vice-president and general manager of the newly-created Ingersoll Utility Unit Div. of Borg-Warner Corp., Chicago. Mr. D'Olive was for many years manager of the appliance division of Stewart-Warner Corp. During the war he was president of Frederick Hart & Co. at Poughkeepsie, N. Y.

• **Philip A. Bohlander** has been appointed assistant works manager of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

• **Karl M. Greiner,** general sales manager of Packard Motor Car Co., Detroit, has been appointed vice-president. He has been with Packard since 1943.

• **Albert B. Willi, Jr.,** has been appointed assistant chief engineer in charge of sales engineering, Federal-Mogul Corp., Detroit. He has been associated with the engineering department of Federal-Mogul since 1937.

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European Letter . .

• Was Russian broadcast diplomatic blunder or brilliant stroke of political warfare . . . Truman states there is no new departure in American policy . . . Dangerous public diplomacy should cease.

LONDON—One would like to know whether the Politburo is now reproving its Foreign Affairs Commissar for a diplomatic blunder or congratulating him on a brilliant stroke of political warfare. By rudely broadcasting to the world recently a statement of Russian policy which had been handed to the American Ambassador in Moscow, Mr. Molotov has provoked a depressing series of diplomatic "no bids."

Mr. Truman says there is "no new departure in American policy," Mr. Marshall denies that he has any wish to discuss alone with Mr. Molotov matters affecting other nations, and Mr. Bevin insists that the ground should be cleared before new talks are attempted. To achieve this much in 48 hr is indeed a feat—whether of clumsiness or skill.

It may have been calculated in Moscow that a diplomatic sensation would help Mr. Wallace in the presidential elections, or that the sails of Western Union might begin to flap if the wind blew less steadily from the east. Or Mr. Stalin's advisers may have seen in the full and frank reminder of American policy presented on May 4 an attempt to score a point in the cold war. Or, indeed, it is just possible that Mr. Molotov mistook General Bedell-Smith's *aide-memoire* for a *billet-doux*.

Whichever may be the correct explanation, the hopes that were aroused have been quickly dashed. Having explained to Moscow that the shape of a bipartisan American foreign policy is set, and that it will be modified only in response to a change of tone in Russian policy, Mr. Marshall has now to persuade a disappointed Europe that a desire for general conversations is no new feature of the policy of the Russians, and that they could better express their goodwill, in more than one capital or committee, by action instead of words.

But Mr. Marshall is entitled to expect that there should be no suspicion or resentment in London or Paris or Brussels about his single-handed and secret approach to Mr. Molotov. A joint approach would have been regarded in Moscow as tantamount to a threat; a public gesture would have been treated as a challenge or ignore. General Bedell-Smith's memorandum was well-timed, carefully drafted and free from any taint of appeasement.

IT is not easy to do justice to the spirit of the argumentative Russian reply, because its version of postwar international history is the usual Marxist fantasy. It is friendly—by the standards of 1948—in so far as it speaks of the "positive attitude" with which the Soviet government receives the American assurance that "the door always remains open for discussion and settlement of our differences." But the Russians at once aroused suspicion of their good faith by interpreting it as "the proposal to *begin* . . . a discussion and settlement of the differences between us," and by then broadcasting the distortion to the world in the midnight hours.

As for the American statement, there is a significant sentence which has escaped notice. Referring to attempts by Communist minorities to seize power and establish "regimes subordinated to foreign interests," it declares that, if these attempts ceased,

> then the necessity for certain manifestations in the foreign policy of the United States which evidently cause dissatisfaction in Moscow will be eliminated.

That is a broad and promising hint of possible concessions. There is no counterpart to it in the Russian reply, save the general suggestion —by no means a concession—that Russia would be interested in a program of European economic recovery outside the limits of the Marshall Plan. This is hardly the way to appeal to Mr. Marshall.

THE public airing of the two government's statements will have done a little good to the American and Russian publics. But in Europe it will have done great harm, by encouraging the appeasers. If any progress towards negotiation and settlement is now to be made this dangerous public diplomacy should cease. It is no good Mr. Marshall's pointing to the UNO council table. That method has been tried with the Russians and has failed too often. There should be negotiations through diplomatic channels, with the most careful preparation and without popular expectation of quick results. For the general agreement which is—and always has been—the objective of British and American policy may take years to achieve.

Meanwhile, the measures taken to strengthen the West—political and military as well as economic—must go on swiftly and steadily, just as the consolidation of the east European *bloc* will go on. The condition of reaching, let alone maintaining, a general settlement between Russia and America is to achieve a new balance of power in Europe.

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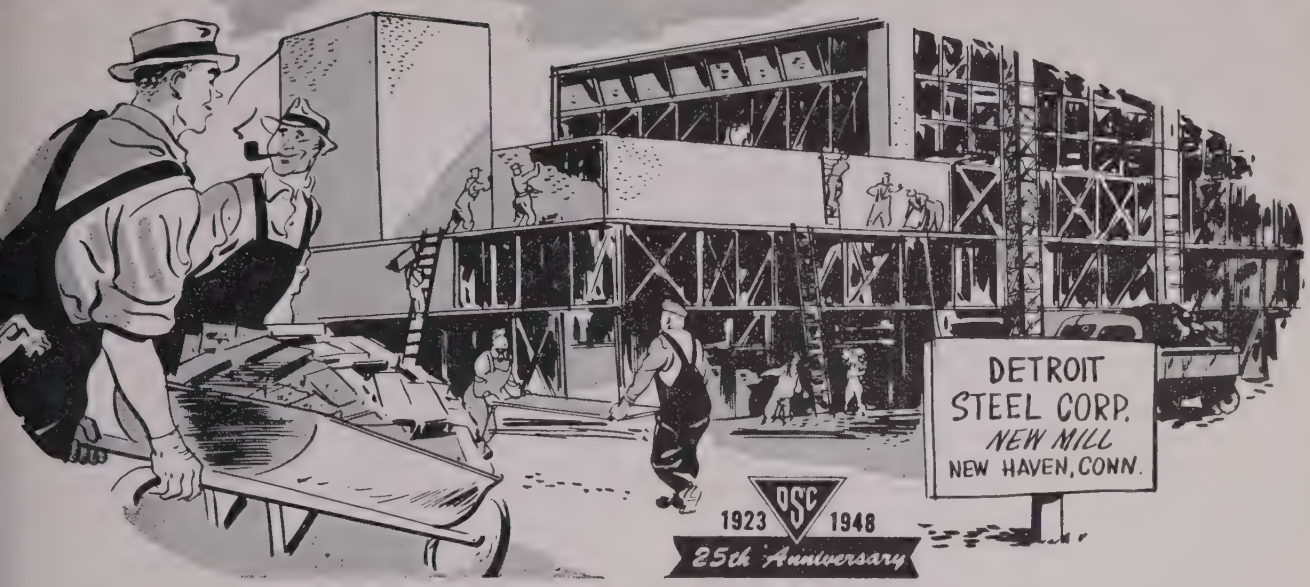
MORE STEEL COMING FOR DSC CUSTOMERS



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Frankly, we may be unable to accept new business now, but looking ahead, we would like to keep you informed about our expanding facilities.

Now under construction . . . a big, new cold rolled strip mill in New Haven, Conn., scheduled to begin rolling by October 1, 1948 . . . to give Eastern customers 60,000 tons additional producing capacity . . . practically at their stockroom doors.

Improvements at our Detroit Mill to step up that unit's producing capacity to 150,000 tons a year . . . to increase the supply of cold rolled strip available to Midwestern customers by about 35,000 tons a year.

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That our Detroit mill . . . our Reliance Division network and our Craine-Schrage Steel Division will continue to do everything possible to keep your production rolling . . giving every account equitable consideration . . . constantly planning and working toward greater production and supply . . . and towards higher standards of steel service.

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Products: SHEETS—Hot Rolled . . . Hot Rolled Pickled . . . Cold Rolled . . . Long Terne . . . Galvanized; PLATES; COLD ROLLED STRIP STEEL—Coils and Cut Lengths . . . Slit or Round Edge . . . All Tempers.

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Industrial News Summary...

- **No Early Letup Seen in Steel**
- **Basing Point Fight Gets Hot**
- **Scrap Market Shows No Change**

ALMOST 3 years after the end of the war there is no end in sight for the current strong steel demand. This week there was little chance that steel consumers would see a buyers' market for at least a year or longer. While steel users tried to figure out where to buy the cheapest steel from mill sources there was an even chance that a coal strike in July or sooner would lose more steel.

Since the war ended more than 20 million net tons of steel ingots have been lost due to strikes. Had it been available for the history making steel demand which has been strong despite the periodic crystal ball gazers' guesses of an iminent balance the clamor for steel this week would be at a normal pitch instead of a healthy roar.

Demand for more steel capacity which has been argued pro and con for 2 years or more is expected to be spotlighted more strongly now that steel will be harder to get. The European Recovery Plan and domestic defense requirements will furnish the backdrop for renewed arguments. But it will be mostly a battle of words. Present capacity can not be fully utilized. Coal and ore are problems now. Also steel mills haven't had a long chance to exploit all of their existing capacity—the Spring or Summer coal strikes have prevented that.

In the next 2 years total steel capacity of the country may approach 97 million tons—only a short distance from the goal demanded at various times by governmental critics of the steel industry. But by that time the face of the steel industry may be so changed because of the basing point controversy and high freight rates that a little matter of capacity will be small potatoes.

TWO mills in the past week or so have begun selling products on an f.o.b. mill basis. One mill in the middle west has done so because freight rates make further freight absorption too costly for that company. The other firm has gone to an f.o.b. mill basis on hot rolled sheets in order to make sure that its sales do not involve the payment of freight charges not actually incurred—in other words no phantom freight charges.

But the entire steel industry has not gone to an f.o.b. mill system. It probably will not do so unless forced by a Supreme Court decision specifically aimed at steel. As long as steel demand outweighs supply it is the mills' best interest to sell at a base price plus freight—a method that is similar to an f.o.b. mill system. When lean days come there is little chance that any steel mill will let business pass them by—no matter what sales method is used.

There was little doubt this week that the steel industry is in for major changes in selling practices. Unless Congress should pass laws supporting the multiple basing point system, that method of selling is out in steel—at leat that is the opinion of some steel lawyers and steel officials. But the fight will go to the bitter end because steel people honestly think that th present demands of the FTC on steel firms are errone ous, lack practical knowledge of the steel industry, ar theoretical and are dangerous to the free flow of stee to users throughout the country. Time will prove wh is right—according to law.

Steel users this week were more confused pricewis than they have ever been in their lives. There wa no rhyme or reason to the crazy quilt of steel price at major centers. Some prices were lower than other depending on who the supplier was. In some case freight was being absorbed on distant hauls—in othe cases it wasn't.

CONSUMERS were working overtime studying pos sible future locations and their relation to ade quate and cheap steel. But it was not all so simple t figure out. The general observation that it would b advantageous to be located in a steel mill area wa only a half truth. The steel consumer was rapidl finding out that his distance from his consuming mar ket played as big a part as his nearness to a stee source.

Then he was being plagued with conjectures as t what will happen when demand falls off and steel i easier to get—will the mill equalize freight?—can h get what he wants where he is?—will his purchase be individual affairs and a host of other unanswere questions.

There was more than a chance that the wholesal movement of steel users to steel producing areas woul not materialize. But there was a certainty that stee costs had become so high that even in cut-throat day to come mills would think twice before absorbing to much freight. That plans for eastern mills will b pushed and restudied is a certainty just as is the clos scrutiny to be placed on equipment and steel mills to far from customers.

The only consolation the steel industry had thi week was the steadiness in the scrap market. Wit warmer weather here and no sharp increases in price no one looks for a higher scrap price level. Many ar looking for lower prices—they may look in vain, ye some brokers and dealers may again yield to the pres sure of steel mills which are trying to support thei price cuts with lower steel making costs.

There was no sign this week that steel firms wer happy about the anti-inflation results of steel pric cuts. So far there has been no general decline in th price of items used by the steel industry and no gen eral decrease in the costs of living for steel workers But steel officials who put thir faith in this unprece dented move ask for patience, caution and a chanc to see what happens in a few more months. If noth ing does happen Philip Murray's position in nex year's steel wage negotiations will be too strong fo another "no"—if not before that time.

The steel rate this week is up ½ point to 95.5 pc of capacity.

• **COAL STRIKE**?—John L. Lewis has served notice that he intends to bring up the pension problem at coal negotiations when they are resumed. If he does this it may give the lawyers a field day for interpretations. The miners may finally strike over the pension controversy instead of the battle over who attends the meetings. If that is the case and the walkout does not come until 80 days after the injunction was slapped on in April it may be that the government can do nbthing because of the right for the miners to strike after the provisions of the Taft-Hartley Bill have been respected. It will then be the job of President Truman to go to Congress—the government can not again use an injunction if the strike is over the same thing which called forth the original halt order—providing the strike does not happen until the 80 days are up.

• **BASING POINTS**—First formal recognition by Congress of the possible effect of the outlawing of basing points came on May 20 when Sen. Cpaehart, R., Ind., asked the Senate to put up $14,000 for an inquiry covering the Supreme Court's decision in the Cement Case. Present and potential repercussions on business generally would be examined by the Senate Commerce Committee between now and Mar. 15, 1949, under his proposal.

• **SCRAP TALK**—Steel and scrap industry officials feel greatly encouraged over the possibility of getting additional scrap out of Germany as the result of the position taken by newly-appointed Commerce Secretary Charles A. Sawyer at a meeting of the Interdepartmental Scrap Committee last week. Mr. Sawyer took a strong stand on getting some of the 10 million German scrap surplus to this country. He emphasized that this quantity should be ample to supply European needs with a substantial quantity left over for the United States.

• **F.O.B. MILL PRICES**—Effective May 15 Wisconsin Steel Co. announced that the sale of all iron and steel products they make will be sold on an F.O.B. mill price. Last Feb. 3 this mill put all alloy products on this basis. Officials of the company told IRON AGE this move has nothing to do with FTC rulings on basing points, but was simply a matter of not being able to absorb the losses of having to pay present freight rates.

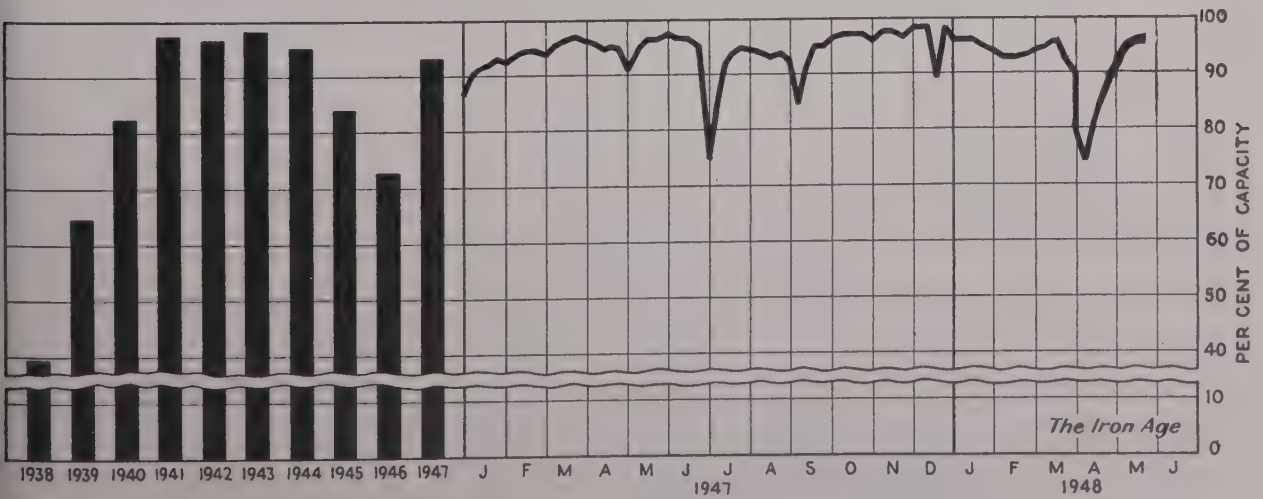
• **WRY NOTE**—"I predict trade associations are out," Federal Trade Commissioner Lowell B. Mason declares, "if the laws stand as they are now." Mr. Mason bases his prediction on the present trend in court decisions placing greater reliance on original decisions by agencies of the Federal Government. "Hazards of membership will hardly be worth any legitimate advantages," Mr. Mason states. "I can see nothing but a decadent economy controlled by an aggressive central government." Mr. Mason also predicted that Congress would never legalize any price fixing system regardless of the effect of the outlawing of basing point price systems.

• **SALES SUGGESTION**—Carnegie Illinois Steel Corp. increased its shipments of high strength low alloy steels by 80 pct last year, according to Thomas J. Hilliard, sales vice-president. Mr. Hilliard estimated that at least half of the industries handicapped by the sheet and strip shortage could ease their production problems by using more of this type steel.

• **FAST WORK**—A major re-lining and improvement of the Canton blast furnace, Republic Steel Corp., was completed last week in what is believed to be record time for the amount and variety of work involved. The furnace was blown out on April 3 and relighted May 14. The work was performed in 41 days and 5 hr from blow-out to relighting. All firebrick was torn out and replaced, a carbon hearth installed and a large amount of steel construction undertaken. The furnace has a rated capacity of 235,000 tons per year and provides hot metal for Republic's alloy steel plant.

• **NATIONAL CUTS**—Ernest T. Weir, chairman of National Steel Corp., has announced price reductions which, on an annual basis, will amount to $4,600,000. The new prices were effective Mav 15. They are equal to an average of $1.50 per ton on the company's shipments of finished products, estimated at about 3 million tons in 1947. In addition to previously announced tinplate price reductions of 10¢ per base box, it is understood that cold-rolled sheets and strip have been cut $2 a ton to 3.66¢ per lb delivered in Detroit and to 3.45¢ per lb Pittsburgh base.

Steel Ingot Production by Districts and Per Cent of Capacity



	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
	99.0*	93.5	92.0*	90.0	99.0*	93.0	104.0*	102.0	102.0	87.5	99.0	78.0	98.0	95.0
	98.5	94.0	93.0	90.0	95.0	93.0	104.0	102.0	102.0	94.0	99.0	84.0	98.0	95.5

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CORROSION-RESISTANT HIGH-TENSILE STEEL

J&L STEEL

WHOLE SIDES OF THE SEAWORTHY 26-FT. CRUISERS ARE CUT FROM SINGLE SHEETS OF OTISCOLOY.

Famous Boat Builder Shatters Tradition with Otiscoloy Steel Construction

By building standard models, employing mass production-line methods, and using J&L Otiscoloy High-Tensile Steel, Churchward & Co., Inc., of West Haven, Conn.—the "Ford of the waterways"—offers a type of construction to the small boat field that heretofore has only been available in large naval and commercial craft and in custom-built yachts.

Because Otiscoloy is highly resistant to abrasion and corrosion—and 35% to 40% stronger than mild steel—Steelcraft obtains *strength* with *light weight*, *safety* and *life-time durability* at surprisingly *low cost*.

Efficient, beautiful streamlining is easily accomplished, because of the excellent workability and ripple-free flatness of Otiscoloy sheets.

Assembly of Steelcraft cruisers is facilitated because welding is fast and may be done by any process.

Many other fabricators are finding J&L Otiscoloy equally advantageous. It reduces expensive dead-weight. It can be formed hot or cold, welded, forged, flame-cut or otherwise worked by standard methods. Its ability to hold paint and to withstand wear, abrasion and corrosive elements is remarkably high.

If you are not acquainted with this modern steel, call your nearest J&L sales office, or write us today for a copy of "Otiscoloy High-Tensile Steel." This booklet contains data on properties, weights, elements of sections and forms available. The coupon is for your convenience.

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COMPANY_____

ADDRESS_____

Raise in Steelworkers Dues Anticipates Need for 'Emergency' Chest

Boston

• • • **The United Steelworkers** of America have served notice on management that they are not taking the rebuff to their recent wage request lying down. At their fourth annual convention here recently they voted to increase their monthly dues from $1.50 to $2.00. This has already been enterpreted by some observers as a union declaration of intent for 1949.

When resistance to the proposal began to develop among the 3000 delegates. President Phillip Murray, who usually concludes debate, took the floor early and declared that "there are 107,000 members of your organization whose contracts are due to expire before December of the present year . . . Your international organization will be required, under those circumstances, to contribute its might toward the maintenance of the people who may be idle as a result of the strikes which they might be forced into during the current year."

Other reasons cited for increasing the dues were to assist with the further organizing of steelworkers and to aid other unions which were striking. The dues collected are divided equally between the international organization and the various locals.

Another highlight of the convention was the dramatic declaration of war against the Taft-Hartley Act. The legal battle is expected to focus on the constitutionality of two main issues: (1) The use of union money to try to elect or defeat political candidates and (2) The filing of non-Communist affidavits, which are a pre-requesite of obtaining use of the facilities of the National Labor Relations Board.

The union case against the first point has already been won in a lower court and is now before the Supreme Court. The test was brought about when Mr. Murray caused a political statement to be published in the *CIO News*, publication of which is supported by union funds. If the highest tribunal should overrule the decision of the lower court, Mr. Murray would be subject to a fine of $1000, a year's imprisonment, or both.

The matter of non-Communist affidavits was referred to the executive committee, after debate by the delegates. The executive committee adjourned without acting on the issue. This, in effect, was a go-ahead signal to Mr. Murray's avowed intention "to test the validity of that provision of the act which requires the filing of affidavits."

Phil Murray Warns of Pacts To Expire This Year; Says Union Must Be Ready

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By BILL PACKARD
Associate Editor

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The union agreed to file the financial affidavit requirements so that a clear cut decision could be reached on the non-Communist affidavit issue. The real difficulty on this point, Mr. Murray told the delegates, is to get the issue before the courts. He said that it was hard to find a means to violate this requirement. Presumably this is because the penalty for non-compliance is negative rather than positive (facilities of NLRB are denied to non-complying unions). It hurts. But it doesn't bring court action.

The delegates were told that an attempt would be made to test this issue in connection with the Inland Steel Case. In the Inland Steel Case the NLRB (1) ordered the company to bargain on pensions (2) provided the union qualified under all the registration provisions of the act within 30 days.

Opposition to this requirement

"To Be Or Not To Be . . ."

on the part of the steelworkers union has been based largely on a matter of principle, since the union does not have a Communist problem within its ranks. Mr. Murray declared that "a Congress which requires an individual to file with the Government his political affiliation before he is entiled to or given the privilege of representing the workers whom he has been elected to represent—can go to any extreme, and I speak now as a matter of principle."

The very mention of the word "Communist" or "Communism" brought repeated, spontaneous demonstrations from the assembled delegates. An interesting sidelight occurred when one delegate, who took the unpopular view, landed outside in the gutter—after he had been accorded the microphone to air his views. The constitution of the union was amended to prohibit Communists from holding union offices. This was regarded as a psychological move to strengthen the union in its impending legal battle on this issue.

The report of failure in the recent wage bargaining was accompanied by a stir of restlessness on the part of some of the delegates. Of interest to industry, on the other hand, was Mr. Murray's pledge to honor the existing contract. "I am cognizant of the fact that agreements are made to be kept," he declared, "and I am one of those who throughout life have religiously maintained that a contractual commitment is a sacred obligation and that one must keep it."

At another point in his keynote address Mr. Murray blasted at industry profits, and contended that the recent price cuts were "a mess of psychological sop offered the American people to help the industry . . . to overcome much of the bad publicity it encountered in February 1948 when it increased the price of semi-finished steel. . . ."

In referring to the wage negotiations, he said "The companies made a decision, and in substance that decision was that we don't think a wage increase will be good for you at this time." He said that, in the course of the bargaining, no representative of the industry denied the fact that living costs in the course of the past few years had reached "extraordinary proportions."

Mr. Murray also (1) called for support of ERP, (2) attacked the use of injunctions to stop strikes and (3) blamed the Communists for the formation of a third party in the United States.

When the question of endorsing a candidate for president was presented to the delegates, they voted to refer the matter to the executive committee for decision at a later date.

J & L Wins Restraining Order Against Gray Market Steel Broker

Chicago

• • • **J & L Steel** Co. won a temporary restraining order against Howard Kimble, gray market broker, in the U. S. Federal Court hearing held here May 18. The order forbids the defendant to use J & L's name in any further deals. The damage suit trial of $100,000 against the defendant will be reopened on Sept. 20 at which time J & L can present further evidence to substantiate their claim.

Another broker, A. A. Schultz of Chicago, was brought into the case after Mr. Kimble had earlier testified that Mr. Schultz was the man who allegedly had 10,000 tons a month of J & L ingots for sale. Mr. Kimble claimed he had been instructed by Mr. Schultz to solicit orders for ingots with the orders made out to the steel company. These orders were to be sent direct to Mr. Schultz. Mr. Schultz, when brought before the court, categorically denied Mr. Kimble's statements.

Correspondence between Mr. Schultz and J. J. O'Donovan, another broker with offices in the Carlton Hotel in Washington, D. C., were subpoenaed by the court and introduced as evidence. These letters offered the above ingots to Mr. Schultz at mill price. Mr. Schultz was to get 25 pct of the resultant sheet tonnage, plus $1.00 a ton if he could arrange the rolling time of the ingots at any mill. Mr. Kimble, it appeared, misunderstood Mr. Schultz's alleged instructions, as he should have been selling sheets.

Mr. Schultz testified that the Pennsylvania Exchange Bank of New York City was used to ascertain if O'Donovan, Inc. actually had or could get ingots. The bank, according to Mr. Schultz's testimony, reported the O'Donovan offer appeared valid. No steel was sold by any of the brokers in this deal. It was evident to steel market observers present at the trial that the whole affair was another gray market merry-go-round episode.

Mr. Schultz testified that during 1947 he did $100,000 worth of steel business. When asked by the company's attorney how much he made per ton, Mr. Schultz replied $5 a ton was his standard commission. He further testified that during the early part of May he had sold nails at $8.75 a keg to the Babcock Lumber Co. of Pittsburgh.

The Chicago sales department of the company had previously secured copies of a steel consumer's orders for 2000 tons of ingots issued at Mr. Kimble's solicitation to the J & L Steel Co. The orders were not sent to J & L but to one of the brokers.

Judge Michael Igoe, in issuing the restraining order said, "It is quite apparent that everybody in this lawsuit is not telling the truth. It does reveal, however, one of the saddest aspects of the economic life of this nation at the present time. We have in this picture today two very minor figures; Mr. Kimble and Mr. Schultz don't mean anything in this picture. They are the most minor figures who appear in it, but here is a challenge to the steel industry. I am going to issue this injunction. I am going to continue this case.

"There has been enough revealed here today to give this steel company, if it is sincere in this matter, and to give the steel industry, if it is sincere in this matter, an opportunity to pursue this inquiry, Here they have the names of the banks, they have the names of the bankers, they have the names of people who are wealthy enough to reside in the Carlaton Hotel in Washington, D. C. They have a suggestion made as to where they can find letters and telegrams.

"Now, if they want to pursue this inquiry, it is shifted from this court and it is shifted away from these two very minor factors in this unsightly picture, and it is placed right on the shoulders of the steel industry.

"That is the challenge that is thrown out to them, and if they want to clean this thing up, they can accept that challenge and go ahead and do a cleaning job. This injunction will be issued, and this matter will be continued for further hearing until sometime in September."

Nonuniform Prices and Shortages Tax Ingenuity of Warehousemen

Some Haven't Yet Adopted New Price Schedules; Others Regret Doing So

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By JOHN ANTHONY
Eastern Regional Editor

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Chicago

• • • **Nonuniform mill prices** and the shortage of warehouse steel products were the two problems uppermost in the minds of the warehousemen who met here for the annual meeting of the American Steel Warehouse Assn.

Warehousemen were in a quandary over their price schedules due to the confusion reigning in mill prices for many products at major basing points. There was no basis for stabilization of warehouse prices at the time of the meeting, nor has any appeared since.

Some warehouses have had a relatively simple problem of adusting their schedules to the new mill prices. These are the subsidiaries of the principal mills who are able to obtain the bulk of their requirements from the parent mill. Nevertheless, at least one such warehouse has been forced to make a revision of its price of floor plates in the East.

The problem of the independent warehouse is much more complex, as it usually involves steel shipments from several sources. Many independents, particularly in the Midwest where the basing point prices are so confused, have not yet adopted a new price schedule, preferring to wait until the price situation is a little better clarified. Some independents revised on the basis of the Corporation's schedule and some are now regretting their hasty action as they must absorb price differentials on some products.

The whole problem of conflicting warehouse prices is a sensitive one to the industry and in some instance warehousemen prefer to leave the discussion of the problem to their home office executives. As far as the consumer is concerned, he can no longer be sure of firm and uniform steel warehouse prices for any product at this time. But as one warehouseman puts it, "the consumer doesn't give a damn for price differences so long as he can get the steel and doesn't have to pay gray market prices for it."

Detroit steel prices are particularly confusing because of the dropping of the arbitrary price base by some mills shipping there. It is understood that there are five price levels for cold-finished carbon bars there.

In the East the major benefit to consumers in recent price announcements was the establishment of the Sparrows Point base for cold-rolled sheets. To warehouse consumers, this represents an advantage of $3.50 a ton for the sizes produced there, estimated at an average of $2 a ton for all cold-rolled sheets.

The prospects for steel warehouse supplies under the impact of the requirements for the rearmament, Economic Cooperation Administration and other priority programs were forecast by David F. Austin, vice-president, United States Steel Corp. of Delaware when he estimated that 17 million tons would be required by them

(CONTINUED ON PAGE 122)

50 YEARS AGO

THE IRON AGE, *May 26, 1898*

• "Serious riots have occurred in a number of Italian cities. In Milan about 1000 persons were shot down by the troops in quelling an outbreak. Martial law has been proclaimed in several parts of Spain, where the public excitement over the Manila defeat has reached an acute stage. The downfall of the Spanish ministry is imminent, with a possibility of the establishment of a military dictatorship."

• **"Andrew Carnegie has made a proposition to give $210,000 for a public library and town hall for Carnegie borough, near Pittsburgh. The proposition will probably be accepted."**

• "The demand for wood working machinery has seen its best days in the Northwest. The great pine forests have disappeared and no longer are extensive shipments of machinery being made to lumber companies. On the contrary, much machinery has been thrown on the market from this region, depressing the trade in new machinery in other parts of the country."

• **"The Missouri mule dealers who formed a trust and put the price of mules up 50 pct, have been thwarted by the Army who rejected all their bids. The trust has been broken and mule dealers are rushing to get bids in at normal figures."**

• "The American Federation of Labor acted commendably in deciding not to force the issue this year on the adoption of the 8 hour working day. The contest was to open up on May 1 with the machinists taking the initiative. It was deemed inadvisable and unpatriotic at this juncture to precipitate such a struggle. It is to be hoped, however, that the matter has not merely been deferred a year, but indefinitely postponed."

Industrial Briefs . . .

• GROUP OFFICERS — John J. Lincoln, Jr., director of sales service, Air Reduction Sales Co., New York, has been elected president of the International Acetylene Assn. A. J. Fausek, president, Modern Engineering Co., St. Louis, was elected vice-president.

• AWARD WINNERS — The Steel Founders Society of America recently announced the following awards to members: Technical and Operating Medal to Charles L. Heater, vice-president and director of American Steel Foundries, Chicago, and the Lorenz Medal to Edgar D. Flintermann, president, Michigan Steel Casting Co., Detroit.

• JET ENGINE CENTER—A $25 million center at Lynn, Mass., for the development, testing and production of aircraft jet engines has been announced by General Electric Co.

• AMA PRESIDENT — Lawrence A. Appley, former deputy chairman and executive director of the War Manpower Commission, has resigned as a vice-president of Montgomery Ward & Co., Chicago, to succeed Alvin E. Dodd as president of the American Management Assn. Mr. Dodd, AMA president for the past 12 years has been elevated to the newly created post of honorary president.

• SCHOLARSHIPS—Ten outstanding high school seniors have been awarded George Westinghouse scholarships, sponsored by the Westinghouse Educational Foundation, valued at $2200 each, to be applied toward an engineering education at Carnegie Institute of Technology, Pittsburgh.

• PLANS OPEN HOUSE — The Weirton Steel Co. is completing plans for a 3-day open house for its Weirton, W. Va. and Steubenville, Ohio, plants to be held June 8-10.

• NEW BRONZE ALLOY—A new aluminum bronze alloy especially engineered for use in forming and drawing dies, has been announced by Ampco Metal, Inc., Milwaukee. Known as Ampco Metal Grade 24 it is a hard, strong wear-resistant bearing metal. The new material has two to five times the life of other bronze dies before redressing and many times the life of steel dies.

• DISTRIBUTOR — The Fairmont Aluminum Co., Fairmont, W. Va., has announced the appointment of Sueske Brass & Copper, 13 N. Peoria St., Chicago, as warehouse distributors for their products and as sales representatives of the mill, covering the states of Illinois, Indiana, Wisconsin and part of Michigan.

• MERGES—Tonawanda Iron Corp., Buffalo, wholly-owned subsidiary of American Radiator & Standard Sanitary Corp., was merged with the parent company and has become the Tonawanda Iron Div.

• BRASS ROD DEPOT—Titan Metal Mfg. Co., Bellefonte, Pa., has announced the opening of a new mill depot at 1410 Madison Ave., Indianapolis, fully stocked with brass rods. Samuel D. Rhinesmith will be in charge.

• ACS MEDAL—The Western New York section of the American Chemical Society has awarded the 1948 Jacob F. Schoellkopf Medal to Marvin J. Udy, Niagara Falls chemical and metallurgical consultant, for his development of methods of plating materials with cadmium and chromium.

• TO HANDLE EXPORTS—The Borg-Warner International Corp. has announced that it will handle the export activities for automotive products of the Hoover Ball & Bearing Co., Ann Arbor, Mich.

Warehouse Meeting

(CONTINUED FROM PAGE 121)

next year as compared with the 14 million tons they now require. He broke down his estimate as follows: Freight cars, 3 million tons; ECA, 2 million; export, 3 million; balance for the Army, Navy, Maritime Commission and some others.

A question on the significance of the cement case decision to the steel industry asked by Harvey Bradley of W. J. Holliday & Co., Indianapolis, was not answered by Mr. Austin.

An increasing number of new warehouse firms established during the last few years, particularly in the smaller steel distribution centers, was reported by Walter S. Doxsey, association president. He attributed the trend to the effect of advancing freight rates, particularly the increases in the differentials between carload and less carload rates which have circumscribed warehouse marketing areas. He reported that some warehouses no longer equalize the transportation charges on shipments back toward mill basing points. This trend toward smaller marketing areas would continue, he predicted, and would be accelerated by the movement of large industries from cities to the open country.

The effect of current mill pricing methods in which extras may run to 25 or 50 pct of the base price may require a revision of warehouse pricing methods, Mr. Doxsey said. Under the warehouse practice of passing along extra charges without compensating adjustments in margins or spreads, such high extras bring down the overall profit margin. He said that warehouse profits have declined about 16 pct.

Briggs Net Income Up

Detroit

• • • **Briggs Mfg. Co.,** Detroit, has reported a net profit for the first quarter of 1948 of $2,044,936 compared with $1,408,580 in the first quarter of 1947. In addition to a steady demand for its automobile products, Briggs noted the growing acceptance of its plumbing ware by the building industry.

W. D. Robinson, president, said Briggs is now feeling the effects of the decline in steel production during the recent coal strike, "This is our No. 1 problem," he said.

OIC Requests 8 Million Tons of Steel for Voluntary Allocations

Washington

• • • **The Office of** Industry Cooperation has finally submitted to the steel industry its estimate of the total domestic steel requirements under the voluntary allocations program.

At a meeting last week with the Steel Producers Industry Advisory Committee, OIC officials pointed out that the best available information indicated that slightly more than 8 million tons will be needed for domestic programs in the 12-month period beginning July 1. The industries covered are now getting about 6 million tons on an annual basis according to OIC.

Broken down, the estimates presented to the industry are as follows:

Freight cars	3,000,000	tons
Petroleum, oil and gas plates, sheet and bars only	3,000,000	"
Farm machinery	1,230,000	"
Heating equipment for housing	318,000	"
Other housing	400,000	"
Atomic energy	160,000	"
Barges for Inland Waterways Corp.	176,000	"
Total	8,284,000	"

OIC officials point out that this estimate does not include any requirements for steel for defense needs which may be presented later. However, defense needs for steel no longer present a frightening picture to OIC and it is believed that they can be met by voluntary means, provided proper legal clearance can be obtained. The same can be said for steel requirements for ERP.

OIC also commented favorably on a steel industry request to have all government steel needs channelled through one agency. The industry wants to eliminate direct requests from a handful of agencies, such as Interior, Air Force and Navy. In addition, OIC agreed to discuss with the Attorney General the legality of meeting steel needs of municipalities within the framework of the Voluntary Allocations Law.

The Steel Producers Committee also approved the earlier recommendations of the Steel Products Advisory Committee that 160,000 tons be made available to the Atomic Energy Commission and an additional 212,000 tons be supplied to warm air furnace industry (THE IRON AGE, May 13, p. 123). These programs cover an 8-month period beginning July 1.

The Producers Committee also resubmitted to the Products Committee for further study the request for 58,000 tons of steel for all-steel prefab houses. The Products Committee had turned down this request on May 6, but government prodding brought about the agreement to reconsider.

Industries Covered Getting About 6 Million Tons Per Year Now

o o o

By GENE HARDY
Washington Editor

o o o

The Senate Small Business Committee, meanwhile, alarmed over reports that the Administration's voluntary allocations program isn't all that it's cracked up to be, this week continued its investigation of the OIC.

Committee probers realize that their investigation must be handled skillfully. The lack of progress in arriving at voluntary allocations within certain industries is due to reluctance on the part of OIC officials to make the law work, they claim, and not to the fact that mandatory controls, and not voluntary controls, are what the economy needs.

Senator Wherry, R., Neb., committe chairman, in questioning John C. Virden, OIC director, as to how he "felt" about the voluntary program, left no doubt that some members of Congress feel OIC has not made a whole-hearted attempt to make the program work.

Asks Faster Increase In Furnace Capacity In Public Interest

Washington

• • • **Unless the** steel industry takes immediate steps to increase its productive capacity at a faster rate, some other means must be found to do the job in the public interest, according to a private report issued by Robert R. Nathan, former deputy director of the Office of War Mobilization and Reconversion.

Industry has completed or has programmed an additional 5 million tons in new facilities since the war, Mr. Nathan estimates. This, he charges, adds no new capacity but merely cancels that lost during the same period.

"If the expansion of facilities is to be left to the decision of the steel companies," Mr. Nathan declares, "it appears that our capacity to produce steel will not be increased sufficiently to meet our needs over the next few years."

Three major sources of demand are given to show the need for expansion—rising demand for durable good because of high employment and income, export demand (including ERP), and the prospective need for peacetime defense program. More production is needed to provide price competition, it is added.

Export demand will extend over a number of years, the report holds, assuming that when European prewar facilities have been restored production will still fall short of growing foreign needs.

Other than estimating that present production is at least 12 million tons short of consumption rates, the report does not recommend specific tonnage increases.

However, both the Bean report, holding that employment levels are dependent upon steel production, and Dept. of Commerce statistics are cited to show that production should amount to 100 million tons annually by 1950 if high employment is to be maintained. Unemployment could reach 9 million by 1950, it was warned.

Steel required for the construction of new plants should be allocated, even at the expense of other requirements, the report goes on to say, holding that the end justifies the means. If the cost and financing are the major obstacles, it adds, "then the matter calls for government action in the national interest."

Construction Steel . . .

New York

• • • **Estimated total bookings** of fabricated structural steel for the month of April totaled 151,139 tons according to reports received by the American Institute of Steel Construction, Inc. This brings the total for the first 4 months to 655,015 tons, an increase of 21 pct over the bookings for the first 4 months of 1947, and 49 pct greater than in the averaged 4 months of the 5 prewar years 1936-1940.

Shipments for the month are estimated at 149,341 tons, and for the 4 months 604,289 tons, an increase of 6 pct over the corresponding period last year.

The backlog, or tonnage available for fabrication, within the next 4 months only is 630,317 tons.

• • • **Fabricated steel awards** this week included the following:

2400 Tons, Davis Dam, Nev., steel transmission line, towers, etc., for 230-kv transmission line, Davis Dam Project, Bureau of Reclamation, Denver, Spec. 2115, to Bethlehem Pacific Coast Steel Corp., San Francisco.

1600 Tons, Davis Dam, Nev., penstocks for Davis Power Plant, Bureau of Reclamation, Denver, Spec. 2104, to Southwest Welding & Mfg. Co., Alhambra, Calif.

600 Tons, Grand Coulee, Wash., steel for bus structure for 230-kv right switchyard and Grand Coulee power plant, Columbia Basin Project, Bureau of Reclamation, Denver, Spec. 2196, to Bethlehem Steel Co., Bethlehem, Pa.

570 Tons, Providence, store for W. T. Grant Co. through Morton C. Tuttle Co., Boston, to American Bridge Co., Pittsburgh.

400 Tons, Cleveland, generating plant for Cleveland Electric Illuminating Co., to American Bridge Co., Pittsburgh.

400 tons, Williamsport, Pa., hospital, to Bethlehem Steel Co., Bethlehem.

280 Tons, State College, Pa., Minerals Industry building for Pennsylvania State College, to Bethlehem Fabricators, Inc., Bethlehem.

160 Tons, Central Valley Project, Calif., steel for switchyard, Keswick Power Plant, Bureau of Reclamation, Denver, Spec. 2034, to Bethlehem Pacific Coast Steel Corp., San Francisco.

115 Tons, New York, one-story garage building for Manhattan News Co. to Grand Iron Works, Inc., New York.

110 Tons, Red Lion, Pa., Red Lion Cabinet Co., building, to Bethlehem Steel Co., Bethlehem.

100 Tons, Ridgewood, N. Y., two-story building for the Home Federal Savings & Loan Institution, to Grand Iron Works, Inc., New York.

• • • **Fabricated steel inquiries** this week included the following:

11,030 Tons, States of Arizona and Nevada, transmission towers for U. S. Bureau of Reclamation.

5000 Tons, Detroit, power station for Detroit Edison Co.

4500 Tons, Cleveland, Ohio Public Service Co.

2215 Tons, Wenatchee, Wash., cantilever bridge on P.S.H. No. 2, Columbia River bridge, Director of Highways, Olympia, bids to June 18.

2000 Tons, Des Moines, office building for State of Iowa.

560 Tons, Milwaukee, stores building for the Wisconsin Electric Power Co.

375 Tons, Napa, Calif., bridges across Napa River and Cayetano Creek, Board of Supervisors, Napa, bids to June 8.

300 Tons, Chicago, Chicago Transit Authority bus terminal.

290 Tons, Lancaster County, Pa., bridge on Route 36007—Section 1, Pennsylvania Dept. of Highways, June 4.

280 Tons, Chippewa County, Wis., bridge section T0284, State of Wisconsin.

260 Tons, Wisconsin, ore dock repair, Great Northern Ry. Co.

180 Tons, Hollis and Buxton, Me., Salmon Falls Bridge over Saco River.

160 Tons, Algoma, Wis., building.

140 Tons, Outagamie County, Wis., bridge section S0384, State of Wisconsin.

135 Tons, Appleton, Wis., building for Sears Roebuck Co.

100 Tons, Presque Isle, Me., Gouldville bridge over Presque Isle stream.

• • • **Reinforcing bar awards** this week included the following:

1000 Tons, Brighton, Mass., Hathaway Bakeries through Edmund J. Rappoli to Truscon Steel Co., Cleveland.

500 Tons, South Bend, Ind., Sears Roebuck store building to Truscon Steel Co., Cleveland.

340 Tons, Chicago, Nathan Goldblatt Memorial Hospital, University of Chicago, previously reported awarded to J. W. Snyder Construction Co. Ceco Steel Products has been awarded the steel contract.

110 Tons, St. Paul, Farmers Mutual Bank Bldg. through Steenberg Construction Co., to Cowin Co.

100 Tons, Iowa City, Iowa, library building for the University of Iowa, all bids rejected.

• • • **Reinforcing bar inquiries** this week included the following.

505 Tons, Wenatchee, Wash., cantilever bridge on P.S.H. No. 2, Columbia River bridge, Director of Highways, Olympia, bids to June 18.

120 Tons, Riverside County, Calif., two bridges between San Diego county line and Temecula, California Div. of Highways, Los Angeles, bids to June 17.

• • • **Railroad car awards** this week included the following:

The Western Maryland Ry. Co. has placed an order with Bethlehem Steel Co., Bethlehem, for 1000 55-ton hopper cars.

Granite City Pig Iron Up

Granite City, Ill.

• • • **Missouri-Illinois** Furnaces, Inc., announced a $1.25 per ton pig iron price increase effective May 17th. The increase, company spokesmen said, was due to a combination of circumstances beyond its control.

Basic iron is now $45.25; No. 2 foundry, $45.75; and malleable, $46.25. An increase on Mar. 25 had set basic iron at $44, with the other grades in proportion. Reasons cited for the increase were: (1) Raw material cost increases since Mar. 25; and (2) the need for making extensive furnace repairs on a risk basis.

Missouri-Illinois has submitted a $3,255,000 bid to War Assets Administration for the furnace but the award, according to the company, is snarled in red tape. It is not sure of getting its repair expense back should its bid be rejected.

Form New Society of Gray Iron Founders In Midwestern Area

Cleveland

• • • **A local group** of management executives has established a Cincinnati Group of Gray Iron Founders' Society which takes in foundries in southern Ohio and parts of Indiana, Kentucky and West Virginia. At the organizational meeting, held in Cincinnati, the following group officers were elected: Chairman, Raymong J. Redmont, Buckeye Foundry Co., Cincinnati; vice-chairman, William Beiser, Reliance Foundry Co., Cincinnati and secretary-treasurer, Frank E. Hutchinson, Reliance Foundry Co.

R. L. Collier, executive vice-president of the society, called attention to the fact that in March of this year the industry shipped 37 pct more cast components than in the peak month of the war period—proof that deliveries are keeping pace with demand in spite of raw material scarcities. He also stated that about half the gray iron foundries in the United States are now embraced in the 15 local management groups thus far organized, six more groups being slated for launching in the next 30 days.

Poor quality and size of foundry coke appears to be the number one problem of the industry at present.

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Cleveland

• • • **Buyers of gray** iron castings need not be apprenhensive about the ability of the foundries to make deliveries due to lack of raw materials, including pig iron and scrap. According to the Bureau of the Census, Dept. of Commerce, in March the gray iron industry shipped 1,169,085 net tons of cast components, a new all-time high record for shipments in any one month.

The March record showed an increase of 14 pct over February. These shipments were 9 pct above the same month last year, and represent shipments at an annual rate of over 14 million tons, about double the best prewar year.

Shipments of gray iron castings for the first quarter totaled 3,257,870 net tons, up 6 pct over the first quarter of last year. Unfilled orders for commercial jobbing castings at the end of March 1948 amounted to 2,726,415 net tons representing a backlog of a little over 2 months' production.

Weekly Gallup Polls . . .

U. S. and German Views Differ on Function of Government

Princeton, N. J.

• • • **A profound difference** of viewpoint toward the purpose and function of government is found among the American people and the German people, according to George Gallup, director, American Institute of Public Opinion.

A survey of public opinion in the American-occupied zone of Germany found Germans saying that if they had to choose they would take a government which provides security and jobs rather than a government which protects personal liberty.

Here in the United States a survey on the same issue finds just the opposite reaction. The overwhelming majority of Americans say that protection of freedom of elections, freedom of speech, religion, etc., is a more important function of government than providing the people with economic security.

The reaction in Germany is undoubtedly due in part to the grave economic condition of the country following the war. People who lack food and money are apt to place more emphasis on security than on freedom. However, the German reaction is probably also due in part to a different basic attitude toward freedom and democracy than that which prevails in the United States.

The issue posed here raises fundamental questions about the whole role of government. Some people say that freedom is meaningless when a man is starving or can't get a job. Radical elements often chastise democracy on the grounds that for the poor and unfortunate democracy often means merely "freedom to starve."

On the other hand, defenders of democracy point out that being well-fed and secure is a hollow mockery if a man can't do and think and say what he pleases; that a full stomach is no compensation for slavery.

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• • • **President Truman's** request for renewal of the Trade Agreements Act is overwhelmingly approved by voters informed about the purpose of reciprocal trade treaties. People who know about the treaties vote better than eight to one to retain them.

But it may come as a shock to educators and national leaders to realize that, after 14 years of debate over Cordell Hull's trade treaty program, the vast majority of voters—two out of three—do not know what "reciprocal trade treaties" are.

Of the representative voters surveyed 34 pct said they know what reciprocal trade treaties are. While relatively few could give exact definitions, most grasped the general idea that such pacts give signatory countries mutual trade concessions. Under the Trade Agrements Act, Congress granted the President power to work out agreements with other countries to adjust tariff rates on individual items on a reciprocal give-and-take basis.

To those knowing about the treaties field reporters for the institute put this question:

"Some people say that because the U. S. is planning to spend $6 billion in the next year on the Marshall Plan it is no longer necessary to continue reciprocal trade agreements. Other people say that the Marshall Plan makes the need for trade agreements more necessary than ever. Do you think the trade agreements should or should not be continued?"

Informed Voters Favor Trade Agreements Act Renewal; Many Are Unfamiliar With Program

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The answers:

	Pct
Should be continued	80
Should not be continued	8
No opinion	12

No major differences between Republican and Democratic voters arise in regard to continuation of the treaties. Eight out of ten in each party supports the treaties, and the same proportion exists among voters who call themselves independent of any party allegiance.

Coming Events

May 31-June 2 **National Assn. of Purchasing Agents,** convention, New York.

May 31-June 5 **American Society of Mechanical Engineers,** semiannual meeting, Milwaukee.

June 6-9 **American Gear Manufacturers Assn.,** annual meeting, Hot Springs, Va.

June 6-11 **Society of Automotive Engineers,** summer meeting, French Lick, Ind.

June 7-9 **American Coke and Coal Chemicals Institute,** annual meeting, White Sulphur Springs, W. Va.

June 10-12 **National Steam Specialty Club,** annual meeting, Hot Springs, Va.

June 16-18 **Electric Metal Makers Guild,** annual meeting, Bethlehem.

June 21-25 **American Society for Testing Materials,** annual meeting, Detroit.

June 28-July 1 **American Electroplaters' Society,** Convention and Industrial Finishing Exposition, Atlantic City.

June 30-July 2 **Machinery Dealers National Assn.,** convention, French Lick Springs, Ind.

July 16-24 **American Road Builders' Assn.,** convention and Road Show, Soldier Field, Chicago.

MACHINE TOOLS

. . . News and Market Activities

Third and Fourth Quarters Look Like Bull Market for Tools

• • • **Outlook for** the machine tool industry for the third and fourth quarters began to take on some of the long range aspects of a bull market this week as the possible machine tool requirements of the various armed services under the rearmament program took tentative shape.

While there's many a slip between the cup and the lip, as the saying goes, and a lot of big talk, the machine tool industry definitely appears to be due for a shot in the arm sometime during the third quarter, which will carry it forward at a high rate of production for many months to come.

Most significant development is the possible requirements of the AAF, some 265,000 machine tools, which was laid before representatives of the industry about 2 weeks ago. Early dope has it that the AAF is not going to need anywhere near this number of machines, but the requirements will still be sufficiently large to put the industry back on a big time basis.

These machines will be purchased by the contractors, prime and sub, but will be owned by the AAF. The AAF, however, will buy some equipment for its bases, it is understood.

Another development of some significance stems from the tentative requirements of the Ordnance Dept. calling for 100,000 machine tools. At a recent meeting in Cincinnati with representatives of local companies, a plan was proposed for pool orders to be released on M-Day (presumably the day many of the citizenry take to the hills or the subways). It is understood there is nothing certain about this program right now, except that it is within the pale of consideration.

Third development is the ERP setup, which will probably not make itself felt to the industry in the form of new firm orders until the fourth quarter. There's a lot of foreign business to be placed under this arrangement, but the official machinery in Washington has not begun to function as yet.

Needs For Armed Services Defense Program Take Tentative Shape

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While ERP orders for machine tools to the tune of $122 million are an assumed certainty in many segments of the trade, there has been nothing set up specifically on machine tools, it is understood. Probable outcome will be that these orders will be placed about the time the rearmament business gets under way and delivery will become an immediate problem.

Reed-Prentice Earnings

Worcester, Mass.

• • • **Net earnings of** Reed-Prentice Corp. for the first quarter of 1948 amounted to $170,170, compared to $164,151 for the corresponding period of 1947.

First quarter 1948 sales amounted to $1,068,936.55. Sales for the first quarter of 1947 were $1,444,676.47, according to F. W. McIntyre, president.

If these requirements are cut in half, the outlook for the machine tool industry will still be extremely rosy, and in fact, require a 100 pct increase in production.

In the meantime, reports from trade sources indicate that business is going along at reasonable pace and if it continues at present levels, the industry will reach the $300 million mark again this year, without any rearmament or ERP orders. This will be somewhat under last year's business on a unit basis, because of the price increases which were announced toward the end of the year.

In Detroit, activity in the machine tool industry is reported to be moderate; no new tooling programs have been announced recently, although orders for modernization and replacement equipment continue in good volume, according to most segments of the industry. There has been some revived interest in tool and die work, although the current volume is reported to be considerably below the first quarter, which turned out to be one of the best in the industry's history.

Some proposals are being received from General Motors with interest at the moment centering around a possible tooling program for a new automatic transmission for Chevrolet. Some additional equipment for building the new Buick dynaflow transmission is also being considered, it is reported.

Some Detroit suppliers have recently received hold-ups on the proposed Reo truck engine program, but it is believed that the present obstacles will shortly be removed. Ordering by small shops continues in good volume, with orders being placed for deliveries of some items as late as 1950.

There is as yet no indication of a tooling program for the new Ferguson tractor plant which is under construction in Detroit.

Boston reports a pickup in business. It is not brisk, but sufficiently better to lend encouragement. There is almost always a market for lathes and they are, perhaps, selling more frequently than other types of tools right now.

Planers, shapers and various types of grinding machines are being booked. Millers have not figured much since the pre-January price advance drove buyers to cover.

Some metalworking plants are inclined to postpone tool purchases until the United States-Russian atmosphere is more defined. Its clearing one way or the other will, the trade believes, result in a freer market for tools.

Variety of Trends Seen in Market

New York

• • • A variety of trends were evident in the overall market picture this week. Pittsburgh and Chicago district consumers were apparently in good shape as far as stockpiles went, for a noticeable increase in rejections on openhearth grades was observed in Pittsburgh and shipments were easy in Chicago. On the other hand, Philadelphia and Cleveland showed comparative firmness.

In Philadelphia the market strength of the past few weeks continued with one consumer still taking genuine No. 1 steelmaking material at a premium price. Some high quality scrap moving from north Jersey and New York to this taker jacked the New York price up to $36.50 to $37.50, creating a spread in the Nos. 1 and 2 grades.

Mills have ducked absorption of the increased freight rate in the Buffalo district at least temporarily, as orders for No. 2 steel and bundles estimated at 15,000 tons were contracted last week at a delivered price of $39.75, the old formula.

Cast prices in Chicago were off $2 in the No. 1 grade of both machinery and agricultural cast. For good cast, however, the market was still very firm, as some foundries which were down for lack of coke and pig iron got back into action.

The strikes in the automotive plants are beginning to slow the Detroit market.

Dealers in several of the markets reported a drop in volume in receipts. But in those markets the trend had not yet affected shipments.

•

PITTSBURGH—The past week saw a noticeable increase in rejections of openhearth scrap. However, steel mills still have a practical attitude on rejections and cars are being turned back only where quality is definitely below present day standards—which are admittedly lower than melters would like. At least one mill is reported in excellent shape for electric furnace grades, is disinterested in this material at present prices and has even succeeded in shading them. Other buyers of these grades haven't followed and these quotations remain unchanged for the week. Cast weakness is talked but prices are firm, except malleable, off $1.

•

CHICAGO—Shipments to mills have been heavy for the past two or three weeks. Last week started off even better. Mills are not too interested in out of district scrap and are even refusing to take material at remote formula prices on which the freight is too high. Some foundries which were down because of coke and pig iron shortages are starting again. For good grades of cast the market is still very firm. No important railroad lists closed last week.

•

PHILADELPHIA—The market here is very strong but a 50¢ downward revision is necessary in No. 2 heavy melting steel. Brokers are buying this grade at $38.50 and $39.00. Other prices are unchanged. Although shipments continue at a high rate, dealers say that the scrap coming into their yards has dropped in volume, which can be expected to react adversely on the volume of future shipments.

•

CLEVELAND—Openhearth grades are in strong demand and there are signs of a weakening supply. Some of the brokers are claiming they can no longer cover at the formula and are giving their 50¢ commission and 50¢ more. Mills have been getting consumption, but shipments are falling off along with the quality of the material. Mills are in position to reject some of these cars, because they have a lot of scrap but they are also using a lot of scrap. Cast is a little weaker. There is a lot of material on track at some consuming points which leads some observers to believe that higher priced orders are around.

•

DETROIT—With the Chrysler strike continuing and a stoppage threatened against General Motors considerable uncertainty overhangs the Detroit scrap market. On the other hand, foundries are reported to be unwilling to make large commitments in the face of possible widespread automobile strikes and the market for cast has softened to reflect this possibility. Pricewise, however, the market remains unchanged and buying continues at formula levels.

•

BUFFALO—Any idea that Buffalo mills would absorb the increased freight rate on scrap was dissipated last week when dealers contracted to deliver an estimated 15,000 tons of No. 2 steel and hydraulic bundles at the old formula of $39.75. The orders also broke up a budding stalemate over prices. The formula was further strengthened by cleaning up of the $42 business in No. 2 steel. A Pittsburgh interest continued to offer $2.50 over ceiling to the east of Buffalo for steelmaking grades, but a high rejection rate has resulted in an increased local supply from that direction. The mills also bought machine shop turnings at the $34.75 price, but refused to pay the premium for shovelings. Low phos scrap was active, with a nearby electric furnace purchasing over 2000 tons of plate at $44.75.

•

NEW YORK—On the basis of movements of No. 1 heavy melting scrap to Philadelphia where a single consumer requires genuine No. 1 material and is paying a premium to get it, the price for that material in this district has followed and is up to $36.50 to $37.50. The market in general has been spotty and somewhat dull over the week.

•

CINCINNATI—There has been little change in the scrap market here. Openhearth material continues to move at formula prices and shipments generally are holding up pretty well. Foundry grades are no stronger, and foundries appear to be pretty well taken care of at the moment. Brokers are having no trouble covering on their orders despite reports that scrap is moving from this sector to the east at high prices.

•

BIRMINGHAM—A price raise of $3 per ton by two of this district's principal merchant iron producers has brought no price increase for cast scrap. Dealers for a few days were reluctant to accept any large commitments in the apparent belief that a higher price might be obtainel. Large consumers of cast refused to pay more, however, and considerable tonnages are moving again at prices quoted before the pig iron advance.

•

ST. LOUIS—Movement of scrap to the St. Louis district slowed up some during the week and it was estimated to be below consumption, as ingot operations were stepped up six points. Steel car axles were up $1 on demand from rerollers.

•

BOSTON—The first noticeable break in many weeks in the cast market sent prices down from $1 to $3 and broke a calm that has existed for almost 3 months. Dealers reported that the demand for cast has fallen off markedly with the foundries not seeking large inventories at present prices. Prices in other grades showed no change with a fair amount of buying at formula prices.

•

TORONTO—The Canadian scrap situation showed little change for the week. Adverse weather and snow in Western Canada and Northern Ontario and Quebec has delayed the movement of scrap from these points to consuming centers in eastern Canada. However, it is expected there will be quite heavy movement of scrap from various outside points later this month. The situation as a whole is none too bright and dealers and consumers have no hope of domestic production meeting all Canadian requirements for several years to come. Big consumers in this country are arranging for large tonnages to be imported during the summer months, although it is not expected that much will reach this country from the States.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $40.50
RR. hvy. melting	41.00 to 41.50
No. 2 hvy. melting	40.00 to 40.50
RR. scrap rails	55.50 to 56.50
Rails 2 ft and under	62.50 to 63.50
No. 1 comp'd bundles	40.00 to 40.50
Hand bdld. new shts	40.00 to 40.50
Hvy. axle turn.	41.50 to 42.00
Hvy. steel forge turn	41.50 to 42.00
Mach. shop turn.	35.50 to 36.00
Shoveling turn.	38.00 to 38.50
Mixed bor. and turn.	35.50 to 36.00
Cast iron boring	38.00 to 38.50
No. 1 cupola cast.	63.00 to 65.00
Hvy. breakable cast.	52.50 to 53.50
Malleable	77.00 to 78.00
RR. knuck, and coup.	54.75 to 55.75
RR. coil springs	54.50 to 55.50
RR. leaf springs	54.50 to 55.50
Rolled steel wheels	54.50 to 55.50
Low phos.	47.50 to 48.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.00 to $39.50
No. 2 hvy. melting	39.00 to 39.50
No. 1 bundles	39.00 to 39.50
No. 2 dealers' bundles	39.00 to 39.50
Bundled mach. shop turn.	37.00 to 37.50
Galv. bundles	35.00 to 35.50
Mach. shop turn.	34.00 to 34.50
Short shov. turn.	35.50 to 36.50
Cast iron borings	38.00 to 39.00
Mix. borings & turn.	34.00 to 34.50
Low phos. hvy, forge	48.00 to 50.00
Low phos. plates	45.00 to 46.00
No. 1 RR. hvy. melt.	41.25 to 41.75
Rerolling rails	53.00 to 54.00
Miscellaneous rails	51.00 to 52.00
Angles & splice bars	52.00 to 53.00
Locomotive tires, cut	54.00 to 55.00
Cut bolster & side frames	49.00 to 51.00
Standard stl. car axles	58.00 to 59.00
No. 3 steel wheels	51.00 to 52.00
Couplers & knuckles	54.00 to 55.00
Rails, 2 ft and under	56.00 to 57.00
Malleable	76.00 to 78.00
No. 1 mach. cast	70.00 to 73.00
No. 1 agricul. cast	60.00 to 63.00
Heavy breakable cast.	51.00 to 52.00
RR. grate bars	60.00 to 65.00
Cast iron brake shoes	58.00 to 60.00
Cast iron carwheels	58.00 to 60.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	38.50 to 39.50
No. 1 bundles	38.50 to 39.50
No. 2 bundles	38.50 to 39.50
Mach. shop turn.	33.00 to 33.50
Shoveling turn.	35.00 to 35.50
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	32.50 to 33.00
Low phos., plate	46.00 to 48.00
No. 1 cupola cast	63.00 to 64.00
Hvy. breakable cast.	53.00 to 54.00
Rails 18 in. & under	60.00 to 61.00
Rails random length	51.00 to 52.00
Drop broken	66.00 to 68.00

BOSTON

Dealers' buying prices, per gross ton, f.o.b. Boston

No. 1 hvy. melting	$31.65 to $31.90
No. 2 hvy. melting	31.65 to 31.90
Nos. 1 and 2 bundles	31.65 to 31.90
Busheling	31.65 to 31.90
Shoveling turn.	.... 28.90
Machine shop trun.	.... 26.90
Mixed bor & turn.	.... 26.90
Cl'n cast chem. bor.	38.00 to 39.00
No. 1 machinery cast	55.00 to 57.00
No. 2 machinery cast	53.00 to 54.00
Heavy breakable cast	52.00 to 53.00
Stove plate	52.00 to 53.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	.... $35.50
No. 2 hvy. melting	.... 35.50
No. 1 bundles	.... 35.50
New busheling	.... 35.50
Flashings	.... 35.50
Mach. shop turn.	$29.00 to 29.50
Shoveling turn.	30.00 to 30.50
Cast iron borings	30.00 to 30.50
Mixed bor. & turn.	28.50 to 29.00
Low phos. plate	39.50 to 40.50
No. 1 cupola cast	55.00 to 57.00
Heavy breakable cast.	48.00 to 52.00
Stove plate	50.00 to 52.00
Automotive cast	55.00 to 57.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	38.50 to 39.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	38.50 to 39.00
Mach. shop turn.	34.50 to 35.00
Shoveling turn.	34.50 to 35.00
Mixed bor. & turn.	34.50 to 35.00
Clean cast chemical bor.	42.00 to 44.00
No. 1 machinery cast	66.00 to 68.00
No. 1 mixed yard cast	62.00 to 63.00
Hvy. breakable cast.	63.00 to 64.00
Clean auto cast.	65.00 to 66.00
Hvy. axle forge turn.	44.00 to 45.00
Low phos. plate	47.00 to 48.00
Low phos. punchings	47.00 to 48.00
Low phos. bundles	45.00 to 46.00
RR. steel wheels	52.00 to 53.00
RR. coil springs	52.00 to 53.00
RR. malleable	75.00 to 78.00
Cast iron carwheels	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.50 to 38.50
Bundled sheets	37.50 to 38.50
Mach. shop turn.	33.00 to 33.50
Locomotive tires, uncut	46.00 to 47.00
Mis. std. sec. rails	46.50 to 47.50
Steel angle bars	49.00 to 50.00
Rails 3 ft and under	52.00 to 53.00
RR. steel springs	48.50 to 49.50
Steel car axles	50.00 to 51.00
Grate bars	60.00 to 62.00
Brake shoes	58.00 to 60.00
Malleable	71.00 to 72.00
Cast iron car wheels	61.00 to 62.00
No. 1 machinery cast	65.00 to 67.00
Hvy. breakable cast	58.00 to 59.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy, melting	.... $37.50
No. 2 hvy, melting	.... 37.50
No. 2 bundles	.... 37.50
No. 1 busheling	.... 37.50
Long turnings	$25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	26.00 to 27.00
Bar crops and plate	42.50 to 43.50
Structural and plate	42.50 to 43.50
No. 1 cupola cast.	64.00 to 67.00
Stove plate	55.00 to 58.00
No. 1 RR. hvy, melt.	38.50 to 40.00
Steel axles	38.00 to 39.00
Scrap rails	44.00 to 45.00
Rerolling rails	51.00 to 53.00
Angles & splice bars	51.00 to 53.00
Rails 3 ft & under	52.00 to 55.00
Cast iron carwheels	48.00 to 50.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $40.50
No. 2 hvy. melting	40.00 to 40.50
Mach. shop turn.	35.00 to 35.50
Short shov. turn.	37.00 to 37.50
Cast iron borings	36.00 to 36.50
Low phos.	45.00 to 45.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$36.50 to $37.50
No. 2 hvy. melting	.... 34.50
No. 2 bundles	.... 34.50
Mach. shop turn.	29.00 to 29.50
Mixed bor. & turn.	29.00 to 29.50
Shoveling turn.	31.00 to 32.00
No. 1 cupola cast.	55.00 to 56.00
Clean auto cast.	55.00 to 56.00
Hvy. breakable cast.	54.00 to 55.00
Charging box cast.	54.00 to 55.00
Unstrp. motor blks.	51.00 to 52.00
Cl'n cast chem. bor.	34.50 to 35.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy, melting	$39.75 to $45.00
No. 2 hvy. melting	.... 39.00
No. 1 bundles	.... 39.00
No. 2 bundles	.... 39.00
No. 1 busheling	.... 39.00
Mach. shop turn.	34.75 to 35.00
Shoveling turn.	35.00 to 36.00
Cast iron borings	.... 35.00
Mixed bor. & turn.	.... 34.00
Mixed cupola cast.	62.00 to 64.00
Charging box cast.	56.00 to 57.00
Stove plate	62.00 to 64.00
Clean auto cast.	62.00 to 64.00
RR. malleable	70.00 to 75.00
Small indl. malleable	47.00 to 49.00
Low phos. plate	44.75 to 46.00
Scrap rails	50.00 to 51.00
Rails 3 ft & under	57.00 to 58.00
RR. steel wheels	51.00 to 52.00
Cast iron carwheels	51.00 to 52.00
RR. coil & leaf spgs.	51.00 to 52.00
RR. knuckles & coup.	51.00 to 52.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	39.50 to 40.00
No. 1 bundles	39.50 to 40.00
No. 1 busheling	39.50 to 40.00
Drop forge flashings	39.50 to 40.00
Mach. shop turn.	34.50 to 35.00
Shoveling turn.	35.50 to 36.00
Steel axle turn.	39.50 to 40.00
Cast iron borings	35.50 to 36.00
Mixed bor. & turn.	35.50 to 36.00
Low phos.	44.50 to 45.00
No. 1 machinery cast.	65.00 to 70.00
Malleable	75.00 to 77.00
RR. cast.	70.00 to 73.00
Railroad grate bars	60.00 to 62.00
Stove plate	60.00 to 62.00
RR. hvy. melting	40.00 to 40.00
Rails 3 ft & under	60.00 to 61.00
Rails 18 in. & under	61.00 to 62.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting	.... $25.00
No. 2 hvy. melting	.... 25.00
No. 2 bales	.... 25.00

Per gross ton delivered to consumer:

No. 3 bales	.... $19.00
Mach. shop turn.	.... 16.00
Elec. furn. 1 ft under	$32.00 to 34.00
No. 1 cupola cast.	40.00 to 43.00
RR. hvy. melting	.... 26.00

LOS ANGELES

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting	.... $25.00
No. 2 hvy. melting	.... 25.00
No. 1 bales	.... 25.00
No. 2 bales	.... 25.00
No. 3 bales	.... 19.00
Mach. shop turn.	.... 17.00
No. 1 cupola cast.	$40.00 to 42.00
RR. hvy. melting	.... 26.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	.... $26.00
Elec. furn. 1 ft and under	.... 30.00
No. 1 cupola cast.	.... 40.00
RR. hvy. melting	.... 26.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point.

Heavy melting	$22.00
No. 1 bundles	22.00
No. 2 bundles	21.50
Mechanical bundles	20.00
Mixed steel scrap	19.00
Mixed borings and turnings	17.00
Rails, remelting	23.00
Rails, rerolling	26.00
Bushelings	17.00
Bushelings, new fact, prep'd	21.00
Bushelings, new fact, unprep'd	16.00
Short steel turnings	17.00
No. 1 cast	$42.00 to 46.00
No. 2 cast	35.00 to 37.00

*Ceiling Price.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

NONFERROUS METALS

. . . News and Market Activities

Natural Gas Will Be Power Source at Alcoa's New Texas Plant

New York

• • • **In 2 years** the Aluminum Co. of America expects to be able to produce an additional 70 million lb of ingots a year at a new reduction plant to be established at Point Comfort, near Port Lavaca on the Texas Gulf Coast between Corpus Christie and Galveston. But this added capacity will do little to improve the company's capacity as it will lose capacity of 40 million lb next March when the antiquated Niagara Falls potline is to be closed down.

Natural gas is to be used as the source of power for the new plant. Eighty thousand kilowatts will be developed from a battery of 80 Nordberg diesel engines. While this is the first peacetime use of power for Alcoa reduction plant developed from ohter than hydroelectric sources, Reynolds Metals Co. has been using gas power for diesel engine operation at its Jones Mills, Ark. plant. At the most favorable rates possible for natural gas, this development represents a cost increase factor in the production of aluminum.

Other cost factors involved in the establishment of the new plant at this location are very favorable. Freight rates on the shipment of raw materials are expected to be low. Alumina plants are operated by the company at Mobile, Ala. on the Gulf, from which barge shipments are possible; and at East St. Louis, Ill., on the Mississippi. Access to mills, especially to the new sheet mill at Davenport, Iowa, and to coastal market areas by water is improved by the strategic location of the plant.

The decision of Alcoa to turn to gas power for its latest plant is a turning point in the aluminum industry. Low cost hydroelectric power in tremendous quantities has been the keystone in the industry's production and cost structure. But the other aluminum producers are pinning their hopes for expanded capacity on additional water power developments. However, they say the day of privately financed large-scale hydroelectric plant has passed with the entry of government into power and reclamation projects.

Texas Coast Plant Capacity, Rated At 70 Million lb, Offsets Other Loss

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The requirements of aluminum for the 70 group airforce have been played down in some quarters as inconsequential when compared with the nation's current aluminum production of about 1¼ billion lb. However, the rearmament program contemplates the use of light metal equipment on a large scale for an airborne army. The fact remains that the present power resources of the nation are inadequate to support any major growth in aluminum production.

The power problem of aluminum producers is tied to a national power shortage in the United States and in Canada. The growth of industry in the Northwest has made demands upon the present power resources of the Bonneville Power Administration which prevents full operation of existent aluminum reduction plants in the West. Northwestern power has been diverted to other industries that are larger employers of manpower per unit of power consumed.

The St. Lawrence Seaway project, defeated on a treaty basis in the present session of Congress largely because of the opposition t it as a deep water traffic artery t the Midwest by eastern por authorities and Midwest mining in terests, may yet be realized as power project under the stress o emergency needs by the U. S. an Canada. Pressure is already bein applied for action by executiv order which would not require th approval of Congress.

Nonferrous Metals Prices

	May 19	May 20	May 21	May 22	May 24	May 25
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	94.00	94.00	94.00	94.00	94.00	94.00
Zinc, East St. Louis	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis	17.30	17.30	17.30	17.30	17.30	17.30

Dow Lowers Extensions

Midland, Mich.

• • • **The Dow Chemical** Co. ha put into effect a new pricing metho on magnesium extruded sol shapes and rectangles which easier to calculate, and has reduce the prices of its other extrude products. The new method of pri ing shapes is based on the weig per foot and takes into consider tion the perimeter of the shape inches. The former method price by means of a form factor obtain by multiplying the perimeter inches by 0.64 and dividing by t weight in pounds per foot.

Solid shapes and rectangles a estimated by the company to ave age 2 pct higher on Dowmetal M 10 pct lower on FS; and FS-1, J and O-1 are unchanged.

Round rods average 2 pct low in M and FS; 4 pct lower in FS- J-1 and O-1. Tubing averages pct lower in M; 13 pct lower FS; 3 pct lower in FS-1; 9 p higher in J-1.

Limit Nickel For 18-8

New York

• • • **Stainless steel** producers ha been informed that the supply nickel available to them in 1948 to be limited by their 1947 co sumption pattern. It is understo that a large part of the producti of nickel is to be diverted to t nickel alloy steels required for t armament program, and for t strategic stockpile. Producers low-carbon ferrochrome have fou their sales volume to have stepp up appreciably in the last 2 mont

Primary Metals

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, 10,000 lb, f.o.b shipping point, freight allowed	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	33.00
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$40.00
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$105 to $115
Lead, St. Louis	17.30
Lead, New York	17.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$75 to $77
Nickel, electro, f.o.b. New York	36.56
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$98 to $101
Silver, New York, cents per oz.	74.625
Tin, Grade A, New York	94.00
Zinc, East St. Louis	12.00
Zinc, New York	12.65
Zirconium copper, 6 pct Zr, per lb contained Zr	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	19.00–19.25
No. 120	18.50–18.75
No. 123	18.00–18.25
80-10-10 ingot	
No. 305	24.25
No. 315	21.75
88-10-2 ingot	
No. 210	30.00
No. 215	28.00
No. 245	22.25–22.75
Yellow ingot	
No. 405	15.25–16.00
Manganese bronze	
No. 421	18.00

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	21.75
0.60 copper, max.	21.50
Piston alloys (No. 122 type)	20.00
No. 12 alum, (No. 2 grade)	19.75
108 alloy	20.00
195 alloy	19.75
214 alloy	21.50
356 XS-679	20.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct.-95½ pct.	20.50–21.00
Grade 2—92 pct-95 pct.	19.50–20.00
Grade 3—90 pct-92 pct.	19.00–19.50
Grade 4—85 pct-90 pct.	18.50–19.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37⅝
Electrodeposited	32⅜
Rolled, oval, straight, delivered	33.09
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	33⅜
Zinc, cast, 99.99	20.50
Nickel 99 pct plus, frt. allowed	
Cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz lots per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	43.00
Copper sulfate, 99.5, crystals, bbls.	11.50
Nickel salts, single, 425 lb bbls. frt. allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	54.00
Sodium cyanide, 96 pct domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc sulfate, 89 pct, granules, bbls, frt. allowed	7.75

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb., f.o.b. shipping point, freight allowed.)

Flat Sheet: 0.188 in., 2S, 3S, 24¢; 4S, 61S-O, 25.8¢; 52S, 27.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢. 0.081 in.; 2S, 3S, 25¢; 4S, 61S-O, 27.1¢; 52S, 29¢; 24S-O, 24S-OAL, 27.7¢; 75S-O, 75S-OAL, 34.3¢. 0.032 in.; 2S, 3S, 26.4¢; 4S, 61S-O, 30.1¢; 52S, 32.6¢; 24S-O, 24S-OAL, 34.2¢; 75S-O, 75S-OAL, 43.1¢.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 4S-F, 23.2¢; 52S, 24.2¢; 61S-O, 23.8¢; 24S-F, 24S-FAL, 24.2¢; 75S, 75S-AL, 30.5¢.

Extruded Solid Shapes: Shape factors 1 to 4; 31¢ to 59¢; 11 to 13, 31.9¢ to 69c; 23 to 25, 33.4c to 90¢; 35 to 37, 40.8¢ to $1.25; 47 to 49, 58.7¢ to $1.84.

Extruded Round Rod, Square, Hex, Octagonal Bar: ¼ in. and over, 27¢ to 38¢; ⅛ to ¾ in., 28¢ to 40.5¢; ⅜ to ½ in., 29c to 43c; ¼ to ⅜ in., 30¢ to 46.5¢; 7/16 to 5/8 in., 32.5¢ to 53.5¢; 9/64 to 3/32 in., 35.5¢ to 62¢.

Rolled Rod: 1.064 to 4.5 in., 2S, 3S, 30¢ to 26.5¢; Cold-finished rod, 0.375 to 3.5 in., 2S. 3S, 32¢ to 28¢.

Screw Machine Stock: Drawn, ⅛ to 1½ in., 11S-T3, R317-T4, 45¢ to 34¢; cold-finished, ⅜ to 1½ in., 11S-T3, 33¢ to 31¢; ⅜ to 2 in., R317-T4, 33¢ to 30¢; rolled, 1 1/16 to 3 in., 11S-T3, 31¢ to 28.5¢; 2⅛ to 3⅜ in., R317-T4, 29.5¢ to 28.5¢. Base 5000 lb.

Drawn Wire: coiled, 0.051 to 0.374 in.; 2S, 33¢ to 24¢ 52S, 40.5c to 29c; 56S, 42.5¢ to 34.5¢; 17S-T4, 46¢ to 31¢; 61S-T4, 41c to 30.5c; 75S-T6, 66¢ to 46¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58c-60c; 10, 59c-61c; 12, 63-65c; 14, 69c-74c; 16, 76c-81c; 18, 84c-89c 20, 96c-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢ 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 1.00 to 0.11 lb. per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/8 $1.14; 5/8 to ⅜, $1.02; ½ to 5/8, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ⅜ to 7/16, 85¢; 5/8 to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, 5/8 to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets		41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks		31

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	33.53	....	33.68
Copper, hot-rolled	....	30.03	....
Copper, drawn	....	31.03	....
Low brass	34.36*	31.39	31.70
Yellow brass	32.92*	29.85	30.16
Red brass	34.89*	31.92	32.23
Naval brass	30.28	29.03	34.97
Leaded brass	28.64	24.69	....
Commercial bronze	35.68*	32.96	33.27
Manganese bronze	33.87	32.37	38.47
Phosphor bronze, 5 pct	53.95*	52.95	52.70
Muntz metal	29.80	28.55	32.99
Everdur, Herculoy, Olympic, etc.	37.24	37.50	38.56
Nickel silver, 10 pct.	41.80	42.68	40.54
5 pct	....	....	38.98
Architectural bronze	28.61	....	....

*Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 lb or more.)

	Heavy	Turnings
Copper	19⅛	18⅜
Yellow brass	15⅝	14¾
Red brass	17⅛	16¾
Commercial bronze	17⅝	16⅞
Manganese bronze	15¼	14⅜
Leaded brass rod ends	15¾	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper, wire	18.75
No. 2 copper, wire	17.75
Light copper	16.75
Refinery brass	16.50–16.75*

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	18.25
No. 2 copper, wire	17.25
Light copper	16.25
No. 1 composition	14.50
No. 1 comp. turnings	14.00
Rolled brass	11.00
Brass pipe	11.25
Radiators	12.00
Heavy yellow brass	10.50
Aluminum	
Mixed old cast	11.00
Mixed old clips	11.00
Mixed turnings	6.00
Pots & pans	11.75
Low copper	12.00

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Copper and Brass

No. 1 heavy copper and wire	16½—17
No. 2 heavy copper and wire	15½—16
Light copper	14¼—14¾
Auto radiators (unsweated)	9¾—10¼
No. 1 composition	12½—13
No. 1 composition turnings	12 —12½
Clean red car boxes	9½— 9¾
Cocks and faucets	9½—10
Mixed heavy yellow brass	8 — 8⅛
Old rolled brass	9½— 9¾
Brass pipe	10 —10¼
New soft brass clippings	12¼—12⅝
Brass rod ends	10 —10⅛
No. 1 brass rod turnings	9½—10

Aluminum

Alum. pistons with struts	6 — 6½
Aluminum crankcases	8¾— 9
2S aluminum clippings	10 —10½
Old sheet & utensils	9 — 9½
Dry borings and turnings	3½— 4
Misc. cast aluminum	8½— 9
Dural clips (24S)	8½— 9

Zinc

New zinc clippings	7½— 8
Old zinc	5½— 6
Zinc routings	3 — 3½
Old die cast scrap	4 — 4⅛

Nickel and Monel

Pure nickel clippings	17 —18
Clean nickel turnings	13 —14
Nickel anodes	17 —18
Nickel rod ends	17 —18
New Monel clippings	12 —13
Clean Monel turnings	8 — 9
Old sheet Monel	10 —10⅛
Old Monel castings	7½— 8
Inconel clippings	9 —10
Nickel silver clippings, mixed	8 — 8⅛
Nickel silver turnings, mixed	6½— 7

Lead

Soft scrap lead	15 —15½
Battery plates (dry)	9¼— 9½

Magnesium Alloys

Segregated solids	8 — 9
Castings	4½— 5½

Miscellaneous

Block tin	75 —77
No. 1 pewter	60 —62
No. 1 auto babbitt	45 —47
Mixed common babbitt	14¼—14¾
Solder joints	17¼—17¾
Siphon tops	45 —47
Small foundry type	17½—18
Monotype	16¼—16¾
Lino. and stereotype	15½—16
Electrotype	13½—14
New type shell cuttings	14½—15
Hand picked type shells	6½— 7
Lino and stereo dross	8 — 8½
Electro dross	6 — 6½

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Steel prices on this page are the average of various f.o.b. quotations of major basing points: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	May 25, 1948	May 18, 1948	Apr. 27, 1948	May 27, 1947
Hot-rolled sheets	2.775	2.775	2.80	2.50
Cold-rolled sheets	3.495	3.495	3.55	3.20
Galvanized sheets (10 ga.)	3.913*	3.913*	3.95	3.55
Hot-rolled strip	2.775	2.775	2.80	2.50
Cold-rolled strip	2.53*	3.53*	3.55	3.20
Plates	2.93	2.93	2.95	2.65
Plates wrought iron	7.25	7.25	7.25	5.95
Stain's c-r strip (No. 302)	30.50	30.50	30.50	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes..	$6.70	$6.70	$6.80	$5.75
Tinplate, electro (0.50)lb)	5.90	5.90	6.00	5.05
Special coated mfg. ternes	5.80	5.80	5.90	4.90
Bars and Shapes: (cents per pound)				
Merchant bars	2.875	2.875	2.90	2.60
Cold-finished bars	3.483	3.483	3.55	3.20
Alloy bars	3.213	3.213	3.30	3.05
Structural shapes	2.767	2.767	2.80	2.50
Stainless bars (No. 302).	26.00	26.00	26.00	26.00
Wrought iron bars	8.65	8.65	8.65	6.15
Wire: (cents per pound)				
Bright wire	3.608*	3.608	3.55	3.30
Rails: (dollars per 100 lb)				
Heavy rails	$2.725	$2.725	$2.75	$2.50
Light rails	3.05	3.05	3.10	2.85
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$45.00†	$45.00†	$45.00†	$42.00
Slabs, rerolling	45.00†	45.00†	45.00†	42.00
Forging billets	54.00†	54.00†	54.00†	50.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	61.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	3.133*	3.133*	2.80	2.55
Skelp	2.88*	2.88*	2.90	2.35

†Net ton *Revised

Pig Iron: (per gross ton)	May 25, 1948	May 18, 1948	Apr. 27, 1948	May 27, 1947
No. 2, foundry, Phila.	$44.85	$44.85	$44.61	$36.51
No. 2, Valley furnace	39.50	39.50	39.50	33.50
No. 2, Southern Cin'ti.	45.47	45.47	43.28	34.75
No. 2, Birmingham	39.38	39.38*	37.38	29.88
No. 2, foundry, Chicago†	39.00	39.00	39.00	33.00
Basic del'd Philadelphia	44.35	44.35	44.11	36.92
Basic, Valley furnace	39.00	39.00	39.00	33.00
Malleable, Chicago†	39.50	39.50	39.50	33.50
Malleable, Valley	39.50	39.50	39.50	33.50
Charcoal, Chicago	65.55	62.55	62.46	45.99
Ferromanganese‡	145.00	145.00	145.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.
* Revised.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$40.25	$40.25	$40.25	$32.25
Heavy mlt'g steel, Phila.	42.50	42.50	41.50	29.75
Heavy melt'g steel, Ch'go	39.25	39.25	39.25	29.25
No. 1, hy, comp. sh't, Det.	35.50	35.50	35.50	27.00
Low phos. Young'n	45.25	45.25	45.25	35.75
No. 1, cast, Pittsburgh	64.00	64.00	64.00	36.50
No. 1, cast, Philadelphia	67.00	67.00	65.50	41.00
No. 1, cast, Chicago	*71.50*	73.50	74.00	37.25
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$12.50	$12.50	$12.50	$10.50
Foundry coke, prompt	14.00	14.00	14.00	11.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro. Conn.	21.50	21.50	21.50	23.00
Copper, Lake Conn.	21.625	21.625	21.625	21.62
Tin, Grade A, New York	94.00	94.00	94.00	80.00
Zinc, East St. Louis	12.00	12.00	12.00	10.50
Lead, St. Louis	17.30	17.30	17.30	14.80
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	36.56	36.56	36.56	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
May 25, 1948	3.24454¢ per lb.	$40.53 per gross ton	$40.66 per gross ton
One week ago	3.24454¢* per lb.	$40.53 per gross ton	$40.66 per gross ton
One month ago	3.27585¢ per lb.	$40.11 per gross ton	$40.33 per gross ton
One year ago	2.85664¢ per lb.	$33.15 per gross ton	$30.42 per gross ton

* Revised

	HIGH	LOW
1948	3.27585¢ Feb. 17	3.22566¢ Jan. 1
1947	3.19541¢ Oct. 7	2.87118¢ Jan. 7
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943	2.29176¢	2.29176¢
1942	2.28249¢	2.28249¢
1941	2.43078¢	2.43078¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
1948	$40.53 May 18	$39.58 Jan. 6
1947	37.98 Dec. 30	30.14 Jan. 7
1946	30.14 Dec. 10	25.37 Jan. 1
1945	25.37 Oct. 23	23.61 Jan. 2
1944	$23.61	$23.61
1943	23.61	23.61
1942	23.61	23.61
1941	$23.61 Mar. 20	$23.45 Jan. 2
1940	23.45 Dec. 23	22.61 Jan. 2
1939	22.61 Sept. 19	20.61 Sept. 12
1938	23.25 June 21	19.61 July 6
1937	23.25 Mar. 9	20.25 Feb. 16
1936	19.74 Nov. 24	18.73 Aug. 11
1935	18.84 Nov. 5	17.83 May 14
1934	17.90 May 1	16.90 Jan. 27
1933	16.90 Dec. 5	13.56 Jan. 3
1932	14.81 Jan. 5	13.56 Dec. 6
1931	15.90 Jan. 6	14.79 Dec. 15
1930	18.21 Jan. 7	15.90 Dec. 16
1929	18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1948	$41.83 Jan. 29	$39.75 Mar.
1947	42.58 Oct. 28	29.50 May
1946	31.17 Dec. 24	19.17 Jan.
1945	19.17 Jan. 2	18.92 May
1944	19.17 Jan. 11	15.76 Oct.
1943	$19.17	$19.17
1942	19.17	19.17
1941	$22.00 Jan. 7	$19.17 Apr.
1940	21.83 Dec. 30	16.04 Apr.
1939	22.50 Oct. 3	14.08 May
1938	15.00 Nov. 22	11.00 June
1937	21.92 Mar. 30	12.67 June
1936	17.75 Dec. 21	12.67 June
1935	13.42 Dec. 10	10.33 Apr.
1934	13.00 Mar. 13	9.50 Sept.
1933	12.25 Aug. 8	6.75 Jan.
1932	8.50 Jan. 12	6.43 July
1931	11.33 Jan. 6	8.50 Dec.
1930	15.00 Feb. 18	11.25 Dec.
1929	17.58 Jan. 29	14.08 Dec.

Based on No. 1 heavy melti steel scrap quotations to consume at Pittsburgh, Philadelphia and Ch cago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound unless otherwise indicated. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of deliverd prices at major ports. (1) Commercial quality sheet grade; primes, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Arbitrary delivered prices. (11) Hollowware enameling, gages 29 to 31 only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only. (14) Kaiser Co. prices (15) from 0.035 to 0.075 in. thick by ¾ to 8½ in. wide. (16) Deliverd Los Angeles; add 0.55¢ per 100 lb for San Francisco. (17) Slab prices subject to negotiation in most cases. (18) 24 to 14 gage, up to 48 in.; 26 gage, up to 22 in.; 30 to 27 gage, up to 36 in.

PRODUCTS	Prices at basing points apply only to the sizes and grades produced at those points.												DELIVERED TO		
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Francisco, Los Angeles	Detroit[10]	New York	Philadelphia
INGOTS Carbon forging	$46.00	Rerolling ingots—$36.00 per net ton f.o.b. mill (Spot market as $75 to $90 per gross ton)													
Alloy	$56.00										Canton = $56.00				
BILLETS, BLOOMS, SLABS Carbon, rerolling[17]	$45.00	$45.00	$45.00	$47.00	$45.00	$45.00		$45.00							
Carbon forging billets	$54.00	$54.00	$54.00	$54.00	$54.00	$54.00	(per net ton)								
Alloy	$66.00	$66.00				(Bethlehem, Massillon, Canton = $66.00)									
PIPE SKELP	2.85 to 2.90						2.90								
WIRE RODS	2.80 to 3.55	2.80 to 3.80		2.80 to 3.05	2.85						Worcester = 2.90	3.5245[13]			
SHEETS Hot-rolled[6]	2.75 to 2.80	2.75 to 2.80	2.75	2.80	2.75 to 2.80	2.80	2.75 to 2.80	2.80		Ashland, Ky. = 2.80		3.494[16] to 3.6875	2.96 to 3.01		
Cold-rolled[1]	3.45 to 3.50	3.45 to 3.55	3.45	3.50		3.55	3.55	3.55[18]	3.65	3.50			3.66		
Galvanized (10 gage)	3.85	3.95	3.85 to 3.95		3.85 to 3.95		3.95	3.95	4.05	3.95	Ashland = 3.95	4.624[16]			
Enameling (12 gage)	3.85	3.75	3.75 to 3.85	3.95			3.95		4.05	3.85			4.11 to 4.16		
Long ternes[2] (10 gage)	4.05		4.05												
STRIP Hot-rolled[3]	2.80	2.75 to 2.80	2.75	2.75 to 2.80	2.75		2.75 to 2.80					3.554[16] to 3.9125	2.96 to 3.01		
Cold-rolled[4]	3.45 to 3.50	3.55 to 3.65	3.55	3.45 to 3.50			3.55			Worcester = 3.65) to 3.75			3.66		
TINPLATE Cokes, 1.50 lb,[5] base box	6.70	6.70	6.70		6.80			6.80	6.90	(Warren, Ohio = $6.80)					
Electrolytic 0.25, 0.50, 0.75 lb, box	Deduct $1.00, 80¢ and 60¢ respectively from 1.50 lb coke base box price.														
TERNES, MFG., special coated	Deduct 90¢ from 1.50 lb coke base box price.														
BLACKPLATE, CANMAKING 55-70 lb, 75-95 lb, 100-128 lb	Deduct $1.60, $1.70 and $1.60 respectively from 1.50 lb coke base box price.														
BLACKPLATE, h.e., 29 ga.[11]	4.65	4.65	4.65					4.75	4.85						
BARS Carbon Steel	2.85 to 2.90	2.85 to 2.90	2.85	2.90	2.85 to 2.90	2.90	2.85 to 2.90					3.579[16] to 3.629[16]	3.06 to 3.11		
Reinforcing (billet)[7]	2.70 to 2.80	2.70 to 2.80	2.70		2.70		2.70					3.325[16]			
Cold-finished[8]	3.45 to 3.55	3.45 to 3.55		3.45									3.61 to 3.76		
Alloy, hot-rolled	3.20	3.20 to 3.30	3.20			3.30	3.20	Bethlehem, Massillon, Canton = 3.30							
Alloy, cold-drawn	4.00 to 4.10	4.00 to 4.10		4.00		4.10		Massillon, Canton = 4.10							
PLATE Carbon steel[12]	2.90 to 2.95	2.90 to 2.95	2.90 to 2.95	2.95	2.85 to 2.90		2.90 to 2.95	Coatesville = 3.45, Claymont = 3.65 Geneva, Utah = 2.90				3.8375[14]			
Floor plates	4.05	3.95 to 4.05	3.95	4.05											
Alloy	3.70	3.70	3.70						Coatesville = 4.80						
SHAPES, Structural	2.75	2.75 to 2.80	2.75 to 2.80		2.75		Bethlehem = 2.80, Geneva, Utah = 2.75					3.424[16] to 3.49			
MANUFACTURERS' WIRE[9] Bright	3.45 to 3.80	3.45 to 4.05		3.45	3.45 to 3.55					Worcester = 3.55 Duluth = 3.50		4.4645[13]			
Spring (high carbon)	4.50	4.50		4.50					Worcester = 4.60 Trenton, Duluth = 4.75			5.5345[13]			
PILING, Steel sheet	3.30	3.30				3.30									

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	Subject to negotiation			Subject to negotiation		
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation			Subject to negotiation		
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt, Beth.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt· Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Jersey City, Reading, Canton, Youngstown, Balt, W. Leechburg	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton, W. Leechburg	32.46	30.30	23.80	24.34	34.82	56.28
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	28.78
Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	82¢
18	4	1	—	5	$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢

High-carbon-chromium*	47¢
Oil hardening manganese*	26¢
Special carbon*	24¢
Extra carbon*	20¢
Regular carbon*	17¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Armature	4.70¢ to 5.05¢
Electrical	5.20¢ to 5.45¢
Motor	5.95¢ to 6.30¢
Dynamo	6.65¢ to 7.50¢
Transformer 72	7.15¢ to 8.25¢
Transformer 65	7.85¢ to 9.20¢
Transformer 58	8.55¢ to 9.90¢
Transformer 52	9.35¢ to 9.70¢

F.o.b. Chicago and Gary: armature through motor only. F.o.b. Granite City add to lower quotation 0.55¢ for armature through and including 72, and 0.45¢ for balance.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, 100 lb and heavier, No. 1 O.H., per 100 lb.....$2.70 to$2.75*

Joint bars, 100 lb	3.75
Light rails (from billets) per 100 lb.	3.05

* CF&I charges $3.05.

	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.55¢
Tie plates, Pittsburg, Calif.	3.70¢
Track bolts	7.00¢
Track bolts, heat treated, to railroads	7.25¢

C-R SPRING STEEL

Base per pound f.o.b. Pittsburgh, Cleveland

0.08 to 0.40 carbon	3.45¢
0.41 to 0.60 carbon	4.95¢
0.61 to 0.80 carbon	5.55¢
0.81 to 1.05 carbon	7.05¢
1.06 to 1.35 carbon	9.35¢

Worcester, add 0.20¢

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	24.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Birmingham

	Base Column	San Francisco
Standard & coated nails*	91	112
Galvanized nails*	91	112
Woven wire fence†	97	120
Fence posts, carloads††	104	...
Single loop bale ties	94	118
Galvanized barbed wire**	111	131
Twisted barbless wire	111	...

* Also Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80-rod spools, in carloads. †† Duluth only.

	Base per 100 lb	San Francisco
Annealed fence wire‡	$4.10	$5.1145
Annealed, galv. fencing‡	4.55	5.5645
Cut nails, carloads‡‡	6.15	...

‡ Add 10¢ at Worcester. ‡‡ Wheeling only, Pittsburgh add 15¢ (less 20¢ to jobbers).

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	NAX High Tensile
Producer	Repub-lic	Carnegie-Illinois, Republic	Repub-lic	Alan Wood	Inland	Bethle-hem	Jones & Laughlin	Youngs-town Sheet & Tube	Great Lakes Steel
Plates	4.55	4.45	4.55	4.55	4.45	4.55	4.45	4.55	4.55
Sheets									
Hot-rolled	4.30	4.20	4.30	4.50	4.20	4.30	4.20	4.30	4.30
Cold-rolled	5.30	5.20	5.30	....	5.20	5.30	5.20	5.30	5.30
Galvanized		5.90	....	....	5.90	6.00	....	....	....
Strip									
Hot-rolled	4.30	4.20	4.30	...	4.20	4.30	4.20	4.30	4.30
Cold-rolled	....	...	5.30	....	....	5.30	5.30	5.30	5.30†
Shapes	....	4.20	....	....	4.20	4.30	4.20	4.30	....
Beams	....	4.20	....	....	4.20	4.30	....	....	....
Bars									
Hot-rolled	4.45	4.35	4.45	....	4.35	4.45	4.35	4.45	4.45
Bar shapes	....	4.35	....	....	4.35	4.45	4.35	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only
Base price, $200.00 per net ton
One producer allows 1 point less discount on steel buttweld.

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
⅛-in.	48	30½
¼-in.	51	34½
1-in.	53½	37½
1¼-in.	54	38
1½-in.	54½	38½
2-in.	55	39
2½ and 3-in.	55½	39½
Wrought Iron, buttweld		
⅛-in.	+11	+35
¼-in.	+ 1½	+25
1 and 1¼-in.	4	+16½
1½-in.	9½	+13
2-in.	10	+12½
Steel, lapweld		
2-in.	44½	28
2½ and 3-in.	48½	32
3½ to 6-in.	50½	34
Steel, seamless		
2-in.	43½	27
2½ and 3-in.	46½	30
3½ to 6-in.	48½	32
Wrought Iron, lapweld		
2-in.	1½	+20
2½ to 3½-in.	4	+16
4-in.	8	+10½
4½ to 8-in.	6	+12

Extra Strong, plain ends

Steel, buttweld		
⅛-in.	46	30
¼-in.	50	34
1-in.	52	37
1¼-in.	52½	37½
1½-in.	53	38
2-in.	53½	38½
2½ and 3-in.	54	39
Wrought Iron, buttweld		
⅛-in.	+ 6½	+29
¼-in.	+ ½	+23
1 and 1¼ in.	4	+16½
2-in.	10	+12½
Steel, lapweld		
2-in.	43½	28
2½ and 3-in.	48½	33
3½ to 6-in.	52	36½
Steel, seamless		
2-in.	42½	27
2½ and 3-in.	46½	31
3½ and 6-in.	50	34½
Wrought Iron, lapweld		
2-in.	4½	+16½
2½ to 4-in.	13	+6
4½ to 6-in.	9	+10½

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

OD		Seamless		Electric Weld	
in in.	Gage BWG	Hot-Rolled	Cold-Drawn	Hot-Rolled	Cold-Drawn
2	13	$17.84	$20.99	$17.30	$20.36
2½	12	23.99	28.21	23.27	27.36
3	12	26.68	31.40	25.88	30.46
3½	11	33.35	39.26	32.35	38.08
4	10	41.40	48.70	40.16	47.24

CAST IRON WATER PIPE

Per net ton

6-in to 24-in., del'd Chicago $93.70
6-in. to 24-in., del'd New York 95.50
6-in. to 24-in., Birmingham 85.50
6-in and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 112.30
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Percent Off List
½ in. & smaller x 6 in. & shorter ..	45
9/16 & ⅝ in. x 6 in. & shorter.....	46
¾ in. & larger x 6 in. & shorter.....	43
All diam, longer than 6 in.	41
Lag, all diam over 6 in. long.....	44
Lag, all diam x 6 in. & shorter.....	46
Plow bolts	54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	43
9/16 to 1 in. inclusive	42
1⅛ to 1½ in. inclusive	40
1⅝ in. and larger	35

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
7/16 in. and smaller	..	46
½ in. and smaller	44	..
½ in. through 1 in.	..	44
9/16 in. through 1 in. ...	43	..
1⅛ in. through 1½ in. ..	41	42
1⅝ in. and larger	35	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate .....65 and 10
In bulk 75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets (½ in. and larger)

Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $5.65
F.o.b. Lebanon, Pa. 5.80

Small Rivets (7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 55

Cap and Set Screws

(In packages)	Percent Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	53
¾ to 1 in. x 6 in., SAE 1035, heat treated	44
Set screws, oval points	57
Milled studs	29
Flat head cap screws, listed sizes...	16
Fillister head cap, listed sizes	37

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	Base price per short ton
70% or more	$35.00
65% but less than 70%	34.00
60% but less than 65%.....	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer.....	$6.60
Old range, nonbessemer.....	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDER

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags....	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe	9.5¢ to 16 0¢
Electrolytic iron, annealed, 99.5+% Fe .....19.5¢ to 39.5¢	
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe.	44.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe...63.0¢ to 80.0¢	
Carbonyl iron, minus 300 mesh, 98%, 99.8+% Fe....90.0¢ to $1.75	
Aluminum	23.0¢
Antimony	44.0¢
Brass .....24.0¢ to 28.5¢	
Copper, electrolytic	30.625¢
Copper, reduced	30.5¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$3.50
Lead	24.0¢
Manganese	50.0¢
Molybdenum, 99%	$2.65
Nickel, unannealed	51.5¢
Nickel, spherical, minus 30 mesh	53.0¢
Silicon	29.0¢
Solder powder .....8.5¢ plus metal cost	
Stainless steel, 302.....	75.0¢
Tin	$1.01¾
Tungsten, 98%, 99%.....	$2.90

COKE

Furnace, beehive (f.o.b. oven) Net Ton	
Connellsville, Pa. .....$12.00 to $13.00	
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa. ..... 13.50 to 14.50	
Foundry, Byproduct	
Chicago, del'd $18.60	
Chicago, f.o.b. 17.50	
New England, del'd 21.75	
Seaboard, Kearney, N. J., f.o.b.. 17.85	
Philadelphia, f.o.b. 19.50	
Swedeland, Pa., f.o.b. 19.50	
Buffalo, del'd 21.75	
Ashland, Ohio, f.o.b. 15.60	
Painesville, Ohio, f.o.b. 19.45	
Erie, del'd 19.95	
Cleveland, del'd 17.90	
Cincinnati, del'd 18.59	
St. Louis, del'd 18.03	
Birminham, del'd 16.71	

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
No. 1 Ohio $67.00	
First quality, Pa., Md., Ky., Mo., Ohio 73.00	
First quality, New Jersey 78.00	
Sec. quality, Pa., Md., Ky., Mo., Ohio 67.00	
Sec. quality, New Jersey 70.00	
No. 2 Ohio 59.00	
Ground fire clay, net ton, bulk 10.50	

Silica Brick

Pennsylvania and Birmingham $73.00	
Chicago District and Alabama 82.00	
Silica cement, net ton (Eastern) .. 12.50	
East Chicago 13.50	

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester $64.00	

Magnesite Brick

Standard, Balt. and Chester $86.00	
Chemically bonded, Baltimore 75.00	

Grain Magnesite

std. ⅜-in. grains

Domestic, f.o.b. Balt. and Chester in bulk, fines removed $51.50	
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	27.00
in sacks with fines	31.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢..$11.0t

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.47	$5.66	$5.92	$4.82	$5.90	$4.82	$4.54	$4.86	$5.73	$8.50	$7.15	$10.18	$10.38
New York	4.84	6.01[1]	6.16	5.08	6.36	5.11	4.80	5.06	5.78	8.58	8.73	10.22	10.43
Boston	4.83	5.69	6.23[12]	5.61	6.87	5.18	4.91	5.04	5.88	8.99	9.14	10.43	10.58
Baltimore	4.32	....	5.72	4.80	....	4.77	4.71	4.65	5.71	....	....	....	....
Norfolk	4.90	....	....	5.30	....	5.15	5.15	5.20	6.00	....	....	....	....
Chicago	4.20	5.00	5.88	4.35	5.35-6.65	4.55	4.35	4.35	5.00-5.10	8.05	8.20	9.30	9.60
Milwaukee	4.57	5.37	5.95	4.72	5.83	4.92	4.72	4.72	5.48-5.58	8.53	8.68	9.78	9.98
Cleveland	4.25	5.10[1]	5.82	5.05	5.95	4.60†	4.70	4.40	5.10	8.61	8.78	9.50	9.85
Buffalo	4.25	5.10	6.06	5.26	5.97	5.01	4.40	4.40‡	5.10	8.20	8.35	9.50	9.65
Detroit	4.41	5.26	6.07	4.77	5.67	4.92†	4 82	4.56-4.82	5.26	8.82	8.97	10.09	10.24
Cincinnati	4.56	5.22	5.57	4.77	....	4.98	4.82	4.78	5.63	8.85	9.00	10.16	10.31
St. Louis	4.59	5.39	6.17	4.69	6.02	4.89	4.74	4.76	5.67	8.92	9.07	10.22	10.37
Pittsburgh	4.25	5.10[1]	5.65	4.35	....	4.60	4.40	4.40	5.10	8.20	8.35	9.50	9.65
St. Paul	4.68	5.53	6.08	4.78	....	5.03	4.83	4.83	6.00	....	....	....	....
Omaha	5.262	....	6.712	5.362	....	5.612	5.412	5.412	6.112	....	....	....	....
Indianapolis	4.55	5.38	5.93	4.65	5.95	4.90	4.70	4.70	5.57	....	....	....	....
Birmingham	4.45[11]	....	5.80	4.45[11]	....	4.65[11]	4.40[11]	4.40[11]	6.13	....	....	....	....
Memphis	4.88[11]	5.94[1]	5.08[11]	....	5.23[11]	5.03[11]	5.03[11]	5.94	....	....	....	....	....
New Orleans	*5.05[11]	6.39[1]	....	5.25[11]	....	5.40[11]	*5.10[11]	*5.20[11]	6.39[6]	....	....	....	....
Houston	5.55	....	7.21	5.65	....	5.90	5.70	5.70	7.00	9.40	9.25	10.40	10.55
Los Angeles	5.78	7.26[1]	7.30	6.00	8.60[5]	5.35	5.15	5.45	7.35[14]	9.55[14]	9.40[16]	10.95[15]	11.25[1]
San Francisco	5.35[3]	6.55	6.95	5.70[3]	8.60	5.30	5.10	5.00	7.40	9.55[15]	9.45[15]	11.05[15]	11.20[1]
Seattle	5.45[4]	7.25[2]	7.10	6.15[4]	....	5.70	5.40[4]	5.65[4]	7.45[14]	....	9.70[15]	....	11.30[1]
Portland	5.70	7.25[3]	7.10	5.85[4]	....	5.70[4]	5.40[4]	5.65[4]	7.45[14]	....	8.95[16]	....	11.30[1]
Salt Lake City	6.40	....	7.85	6.70	....	6.20	6.35	6.55	7.55	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 800 to 4999 lb; (4) 800 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) to 1999 lb.

* Add 46¢ for sizes not rolled in Birmingham.
† Up to ¾ in. thick and 90 in. wide.
‡ Add 41¢ for sizes not rolled at Buffalo.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT* PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	40.00	40.50	41.00	41.50	.....
Birmingham	38.88	.....	.....	.....	.....
		39.38			
Buffalo	40.00-42.38*	40.00-42.88*	40.50 43.38*	.....	.....
Chicago	38.50	39.00	39.50	40.00	.....
Cleveland	38.50-39.75*	39.00-40.25*	39.50-40.75*	.....	.....
Duluth	39.00	39.50	40.00	40.50	.....
Erie	38.50	39.00	39.50	40.00	.....
Everett		45.00	45.50	.....	.....
Granite City	45.25	45.75	46.25	.....	.....
Neville Island	39.00	39.50	39.50	40.00	.....
Provo	39.00	39.50	.....	.....	.....
Sharpsville	39.00	39.50	39.50	40.00	.....
Steelton	40.00	.....	.....	.....	46.00
Struthers, Ohio	39.50	.....	.....	.....	.....
Swedeland	45.00	45.50	46.00	46.50	.....
Toledo	38.50	39.00	39.50	40.00	.....
Troy, N. Y.	.....	.....	.....	.....	46.00
Youngstown	39.00	39.50	39.50	40.00	.....

DELIVERED PRICES† (BASE GRADES)

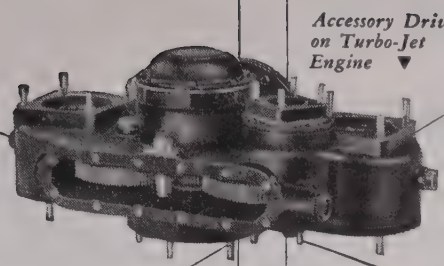
Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	45.50	46.00	.....	.....
Boston	Steelton	6.27	46.27	.....	.....	.....	52.27
Brooklyn	Bethlehem	3.90	43.90	.....	.....	.....	.....
Cincinnati	Birmingham	6.09	44.97	.....	.....	.....	.....
				45.47			
Jersey City	Bethlehem	2.39	42.39	42.89	43.39	43.89	....
Los Angeles	Provo	6.93	45.93	44.43	.....	.....	....
Mansfield	Cleveland-Toledo	3.03	41.53-42.78*	42.03-43.28*	42.53 43.78*	.....	....
Philadelphia	Bethlehem	2.17	42.17	42.67	43.17	43.67	....
Philadelphia	Swedeland	1.31	46.31	46.81	47.31	47.61	....
Philadelphia	Steelton	2.81	42.81	.....	.....	.....	48.8
San Francisco	Provo	6.93	45.93	46.43	.....	.....	....
Seattle	Provo	6.93	45.93	46.43	.....	.....	....
St. Louis	Granite City	0.75 Arb.	46.00	46.50	47.00	.....	....

* Republic Steel Corp. price. Basis: pig iron at Cleveland and Buffalo set by average price of No. 1 hvy. mlt. steel scrap Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnig

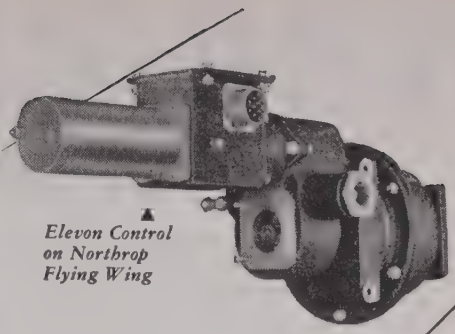
Basing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$49.50; f.o.b. Buffalo—$50.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0 pct or more P. Bessemer ferrosilicon pri are $1.00 per ton above silvery iron prices comparable analysis.

Charcoal pig iron base price for low ph phorus $58.00 per gross ton, f.o.b. L Tenn. Delivered Chicago, $65.55. H phosphorus charcoal pig iron is not be produced.



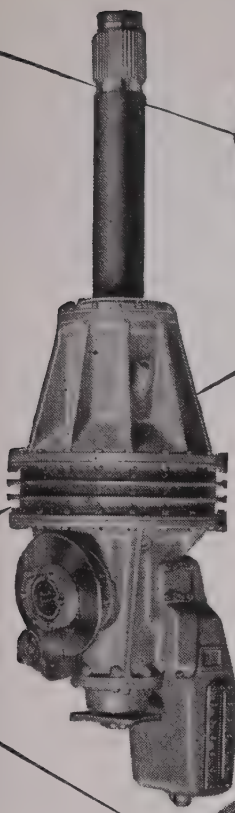
Accessory Drive on Turbo-Jet Engine ▼



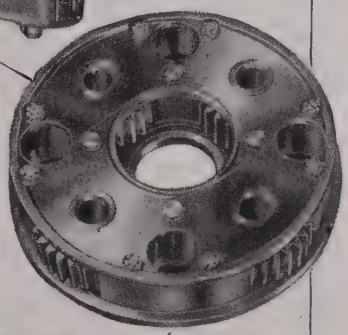
▲ Elevon Control on Northrop Flying Wing

"Packaging" Gears

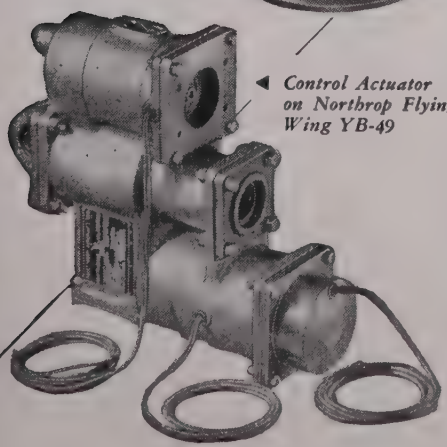
...FOR BETTER PERFORMANCE!



◀ Main Rotor Transmission on Sikorsky Helicopter



Planetary Transmission on Piasecki Helicopter ▶



◀ Control Actuator on Northrop Flying Wing YB-49

Performance of high-quality gears is affected in no small measure by the accuracy of their assembly and the precision of their mounting in their housing. Many manufacturers, recognizing this, look to Foote Bros. for complete units ready to install in the equipment they manufacture.

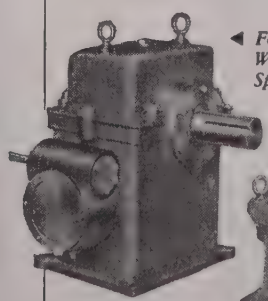
The wide experience of Foote Bros. in the production of equipment to transmit power, to reduce or increase speed, or to provide control, may be of assistance to you.

Foote Bros. Actuators and Power Units may be designed to meet virtually any practical limitation in space or weight. The "A-Q" (aircraft quality) Gears used in their construction permit operation at extremely high speeds, assure low noise level and provide unusually high efficiency.

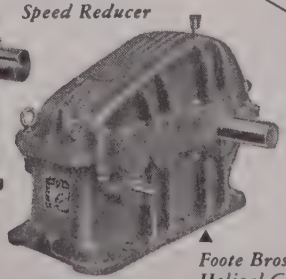
Speed Reducers for general commercial applications are available in both helical and worm gear types in a wide variety of sizes and ratios.

Foote Bros. engineers will gladly recommend the type of unit best suited to your needs or will work with you on the development of units for any special application.

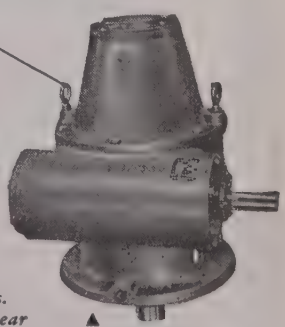
FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. M 4545 South Western Blvd. Chicago 9, Ill.



◀ Foote Bros. Worm Gear Speed Reducer



▲ Foote Bros. Helical Gear Speed Reducer



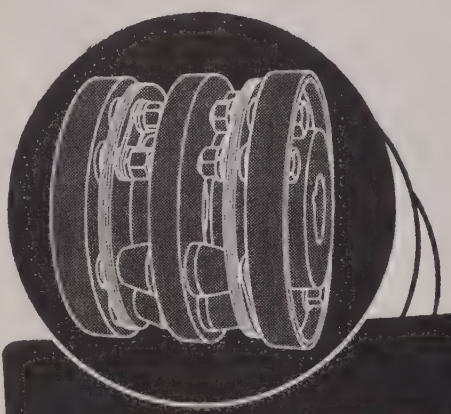
▲ Foote Bros. Vertical Speed Reducer

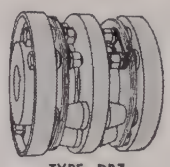
FOOTE BROS.

Better Power Transmission Through Better Gears

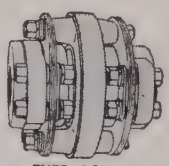
THOMAS *Flexible* COUPLINGS

.... are specified by engineers, wherever 100% Operating Efficiency is demanded





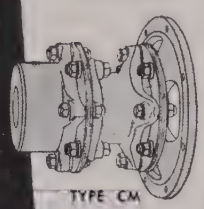
TYPE DBZ



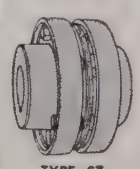
TYPE DSM

THOMAS *Flexible* COUPLINGS provide for Angular and Parallel Misalignment as well as Free End Float ... *and Eliminate* BACKLASH, FRICTION, WEAR and CROSS-PULL

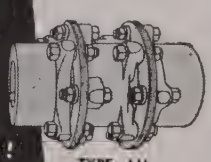
NO LUBRICATION IS REQUIRED!



TYPE CM

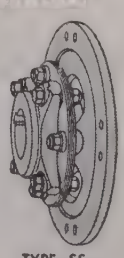


TYPE ST

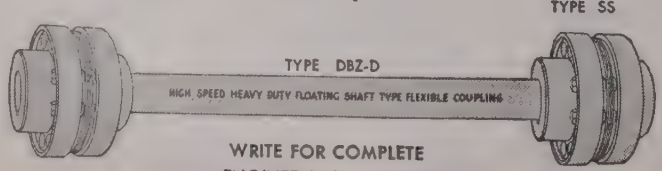


TYPE AM

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.



TYPE SS



WRITE FOR COMPLETE ENGINEERING CATALOG

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Additional Warehouse Chapter Officers Are Announced by Doxsey

Cleveland

• • • **Thirteen chapters** of American Steel Warehouse Association, Inc., have elected officers for the coming year, according to an announcement by Walter S. Doxsey, association president.

Baltimore Chapter

President—Henry A. Lowry, Seaboard Steel & Iron Corp., Baltimore; vice president—Harold K. Dell, John J. Greer & Co., Inc., Baltimore; secy.-treasurer—J. B. Boan, United States Steel Supply Co., Baltimore; nat'l director—George J. Parke, Eagleston-Parke, Inc., Norfolk, Va.

Buffalo Chapter

President — Joseph T. Durham, Drennan Steel Products Corp., Syracuse; vice president—D. P. McCain, Erie Concrete & Steel Supply Co., Erie; secy.-treasurer—D. Enos, Enos & Sanderson Co., Inc., Buffalo; nat'l director—J. Frederick Rogers, Beals, McCarthy & Rogers, Inc., Buffalo.

Central States

President—T. Z. Hayward, Joseph T. Ryerson & Son, Inc., Chicago; vice president—M. O. Hjortland, The Steel Supply Co., Chicago; vice president—J. H. Flora, Hagerty Brothers Co., Peoria, Ill.; secretary—T. B. Daniels, Jones & Laughlin Steel Corp., Chicago; treasurer—C. O. Bucksot, W. J. Holliday & Co., Indianapolis; nat'l director—H. V. Douglas, Central Steel & Wire Co., Chicago.

Connecticut Chapter

President—G. S. Brousso, The C. S. Mersick & Co., New Haven, Conn.; vice president—W. V. Starkie, L. L. Ensworth & Son, Inc., Hartford; secy.-treasurer—J. H. Walters, Chapin & Bangs Co., Bridgeport, Conn.; nat'l director—R. B. Shearer, The C. S. Mersick & Co., New Haven, Conn.

Cincinnati Chapter

President—Edwin Morris, E. K. Morris & Co., Inc., Cincinnati; vice president—R. E. Wente, S. A. E. Steels, Cincinnati; vice president—Louis K. Wirth, Todd Donigan Iron Co., Louisville; secretary—E. W. Patton, Brown Steel Co., Columbus; treasurer—Earl R. Nelson, Joseph

★ SEAMLESS STAINLESS STEEL

★ GLOWELD WELDED STAINLESS STEEL

★ SPECIAL ANALYSES STEEL

★ SANITARY

★ CORROSION RESISTANT

★ POLISHED INSIDE AND OUT

★ SEAMLESS MECHANICAL

★ MACHINEABILITY

★ STRENGTH

★ CLOSE TOLERANCE

★ ANNEALED AIRCRAFT

★ GLOBEIRON HIGH PURITY INGOT IRON

★ HIGH MAGNETIC PERMEABILITY

★ DUCTILITY

★ PRESSURE

★ HIGH TEMPERATURE SERVICE

★ AUTOMOTIVE

★ CARBON

★ ALLOY

★ ROUND

★ SPECIAL SHAPES AND FORMS

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by class or type of steel tubes from GLOBE

Yes, you can select your exact requirements — by class or type steel tubing in almost any size — from Globe Steel Tubes Company.

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GLOBE

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No matter what your burnishing problems may be, you'll find the answers in the *complete* Wyandotte line of burnishing compounds.

Wyandotte Burnishing Compound 317 gives a high luster to parts of zinc, nickel and Monel metal. It works effectively in either hot or cold water. And because this viscous liquid contains no soap or inorganic alkalies, its burnishing action is not affected by the hardness of water. It rinses freely and leaves no scum on the work or in the barrel.

Wyandotte Burnishing Compound 320 gives a highly satisfactory finish to brass, copper, bronze, carbon steel or stainless steel. It is a soap-type compound and contains a non-toxic brightening agent. It may be used for burnishing with steel balls or for combined burnishing and burring with chips or stones.

Your Wyandotte Representative will be glad to tell you more about these and other specialized Burnishing Compounds in the *complete* Wyandotte line. All you have to do is give him a call.

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WYANDOTTE, MICHIGAN • SERVICE REPRESENTATIVES IN 88 CITIES

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Colorado Chapter

President—J. H. Singleton, C. A. Crosta, Inc., Denver; vice president—W. Goldberg, Hassco, Inc., Denver; secy.-treasurer—A. M. Hays, Hendrie & Bolthoff Co., Denver; nat'l director—J. H. Singleton, C. A. Crosta, Inc., Denver.

Detroit Chapter

President—G. R. Link, Central Steel & Wire Co., Detroit; vice president—G. W. Cooke, The Jennison Hardware Co., Bay City, Mich.; secy.-treasurer—H. V. Collins, Whitehead & Kales Co., River Rouge, Mich.; nat'l director—V. R. Bates, Craine-Schrage Steel Div., Detroit Steel Corp., Detroit.

New York Chapter

President—P. O. Grammer, Grammer, Dempsey & Hudson, Inc., Newark; vice president—James M. Mead, Joseph T. Ryerson & Son, Inc., Jersey City; vice president—Rodney Burton, Jones & Laughlin Steel Service, Inc., Long Island City, N. Y.; secretary—Charles Kramer, Newark; treasurer—James F. Bragg, Egleston Bros. & Co., Inc., Long Island City, N. Y.; nat'l director—P. O. Grammer, Grammer, Dempsey & Hudson, Inc., Newark.

Northwest Chapter

President—Roswell H. Hobbs, W. H. Hobbs Supply Co., Eau Claire, Wis.; vice president—Paul G. Rast, Mill City Steel Corp., Minneapolis; secy.-treasurer—L. Almsdale, Williams Hardware Co., Minneapolis; nat'l director—J. K. Rittenhouse, United States Steel Supply Co., St. Paul.

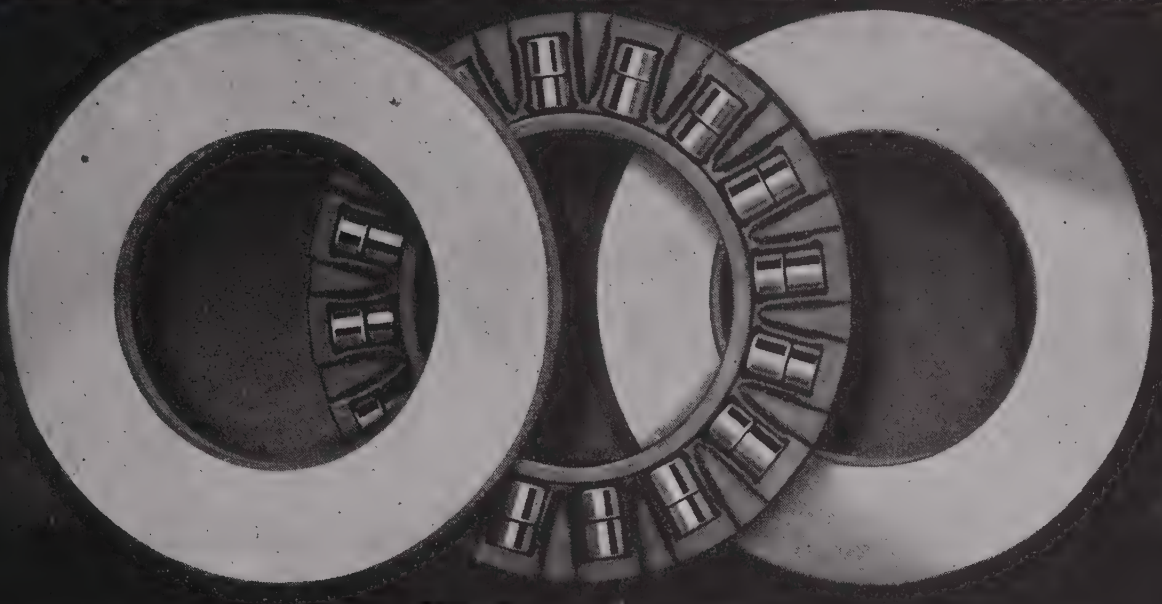
Omaha Chapter

President — Phil Tracy, Lincoln Steel Works, Lincoln, Neb.; vice president—L. O. Schneiderwind, Omaha Welding Co., Omaha, Neb.; secy.-treasurer — F. T. Buchholz, Omaha Steel Works, Omaha, Neb.; nat'l director—Henry B. Neef, Gate City Iron Works, Omaha, Neb.

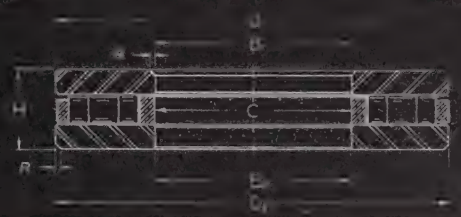
St. Louis Chapter

President—A. L. Petersen, Joseph T. Ryerson & Son, Inc., vice-president—W. Milner Donovan, Donovan Iron & Supply Co.; secretary—L. F. Niemann, United States Steel Supply Co., treasurer—L. J. Haines, E. E. Souther Iron Co.; nat'l director—A. L. Peterson, Joseph T. Ryerson & Son, Inc., all of St. Louis.

KAYDON TYPE RT THRUST ROLLER BEARINGS



STRAIGHT ROLLER TYPE
FLAT RACES
TYPE RT



SIZES AS LISTED
CARRIED
IN STOCK

Bearing No.	Sizes and Dimensions • See Drawing Above						Roller Diam.	R 45° Chamfer	Lbs. †Capacity at 100 R.P.M.
	B_1	B_2	C	D_1	D_2	H			
RT-26	2.002"	2.015"	2.010"	5.968"	6.000"	1.375"	½"	.062"	36,000
RT-27	2.002	2.015	2.010	6.968	7.000	1.375	½	.062	48,300
RT-28	2.002	2.015	2.010	7.968	8.000	1.375	½	.062	65,400
RT-36	3.002	3.015	3.010	5.968	6.000	1.375	½	.062	29,800
RT-37	3.002	3.015	3.010	6.968	7.000	1.375	½	.062	43,600
RT-38	3.002	3.015	3.010	7.968	8.000	1.375	½	.062	55,600
RT-39	3.002	3.015	3.010	8.968	9.000	1.375	½	.062	67,500
RT-47	4.002	4.015	4.010	6.968	7.000	1.750	⅝	.062	34,700
RT-48	4.002	4.015	4.010	7.968	8.000	1.750	⅝	.062	54,600
RT-49	4.002	4.015	4.010	8.968	9.000	1.750	⅝	.062	69,400
RT-410	4.002	4.015	4.010	9.968	10.000	1.750	⅝	.062	89,300
RT-58	5.002	5.015	5.010	7.968	8.000	1.750	⅝	.062	40,300
RT-59	5.002	5.015	5.010	8.968	9.000	1.750	⅝	.062	63,300
RT-510	5.002	5.015	5.010	9.968	10.000	2.000	¾	.125	83,300
RT-511	5.002	5.015	5.010	10.968	11.000	2.000	¾	.125	111,600
RT-512	5.002	5.015	5.010	11.968	12.000	2.000	¾	.125	136,300
RT-69	6.002	6.015	6.010	8.968	9.000	2.000	¾	.125	48,300
RT-610	6.002	6.015	6.010	9.968	10.000	2.000	¾	.125	76,000
RT-611	6.002	6.015	6.010	10.968	11.000	2.000	¾	.125	100,100
RT-612	6.002	6.015	6.010	11.968	12.000	2.000	¾	.125	124,300
RT-710	7.002	7.015	7.010	9.968	10.000	2.000	¾	.125	62,400
RT-711	7.002	7.015	7.010	10.968	11.000	2.000	¾	.125	85,800
RT-712	7.002	7.015	7.010	11.968	12.000	2.000	¾	.125	109,200

ABOVE SIZES IN STOCK FOR IMMEDIATE SHIPMENT

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller • Ball Radial
Ball Thrust • Roller Radial • Roller Thrust

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Division 15, 1226 East 152nd St., Cleveland 10, Ohio
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DO YOU REALLY NEED A NEW PLANT?

Better check first to see how Towmotor Mass Handling can speed up production in your present plant. Handling materials and products the modern, efficient way—with Towmotor Fork Lift Trucks and Tractors—steps up productive output by insuring maximum use of present production time, manpower and equipment. In any plant, large or small, Towmotor Mass Handling has a great deal to offer . . . get the complete story about MH today.

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The Towmotor Materials Handling Analysis Guide shows you how to analyze, correct and improve handling operations in your plant.

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——— NEWS OF INDUSTRY ———

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President—W. F. Kurfess, Joseph T. Ryerson & Son, Inc., vice president—H. R. Wegner, Worden-Allen Co., secy-treasurer—James R. Beers, United States Steel Supply Co., nat'l director—A. S. Fredrickson, Lakeside Bridge & Steel Co., all of Milwaukee.

Munitions Board Calls 114 More War Facilities Essential to Security

Washington

• • • **An additional 114** surplus war-built industrial plants, including nearly two score steel and aluminum plants, foundries and other metalworking plants, have been classified by the Munitions Board as essential to national security. Any disposal arrangements by War Assets Administration will include a governmental recapture clause.

This brings to 423 the number of war-built facilities which will be retained as production potential as a result of various governmental actions. Also, about half the original $12 billion in construction cost is involved.

Of this total, 151 complete plants have been retained by the military services under Public Law 364. These are comprised largely of specialized iron and steel products plants, aircraft factories, shipyards, ordnance and ammunition plants, arsenals and combat vehicle plants.

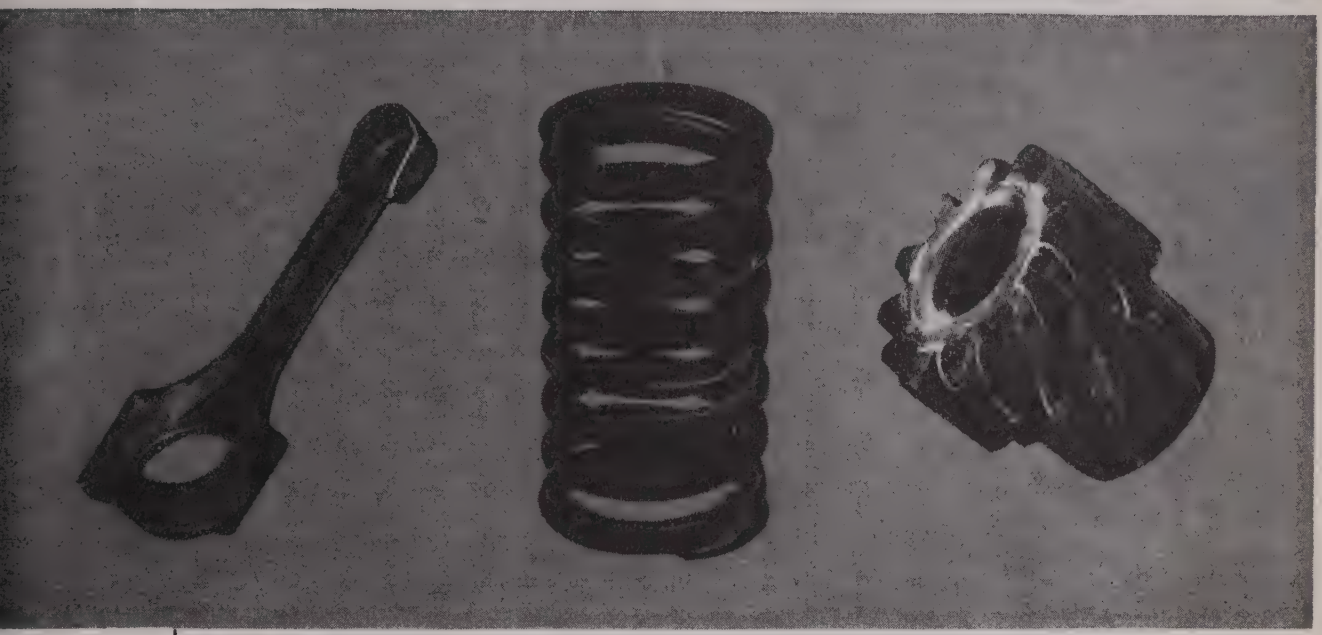
Another 158 plants were on the original list for disposal subject to the Security Clause. Of these, 31 have been sold by WAA, another 30 have been leased to private industry, and 23 are continuing operations for both civilian and military purposes. Nearly half the remaining 62 are of such nature that their disposal to private industry is unlikely.

Included in the new list of 114 plants the the following (numerals are Plancor designation):

Consolidated Steel Corp. plants at Wilmington, Calif., and San

5 Kinds of

TROUBLE YOU DON'T HAVE TO HAVE



Illustrations show how Magnaflux clearly indicates surface and sub-surface cracks and other defects.

When You Inspect with MAGNAFLUX*

YOU Eliminate or Reduce

1. TROUBLE due to excessive scrap in production.

2. TROUBLE from high rate of rejections for defects at final inspection.

3. TROUBLE with particular operations, operators, or processes.

4. TROUBLE with good-will-losing customer returns.

5. TROUBLE due to failure of parts in service.

With proper inspection by Magnaflux at *early* steps in production you can cut manufacturing costs as well as eliminate these five kinds of trouble.

When you inspect at various stages of your operations, you keep your finger on the pulse of production. You catch defective parts *before* additional money is wasted in machining and finishing time. You can single out a process causing defects, and correct it.

Automatic machines for volume production lines enable you to inspect by Magnaflux at low cost. Magnaflux, and other Magnaflux Corporation non-destructive testing means, make fine cracks and other discontinuities readily visible. The non-visible defects such as cracks in castings, seams in bar stock, or laps in forgings are marked by easily seen indications of bright color, or can be made fluorescent under black light. *Every part* can be economically inspected, or sampling inspection used when desired.

Write today for full information on how Magnaflux can help you raise product quality and cut production costs.

**Magnaflux, Reg. U. S. Pat. Off., a trade mark of Magnaflux Corporation applied to its equipment and materials for magnetic particle inspection.*

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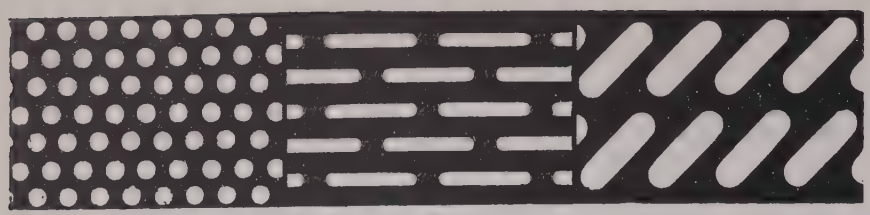
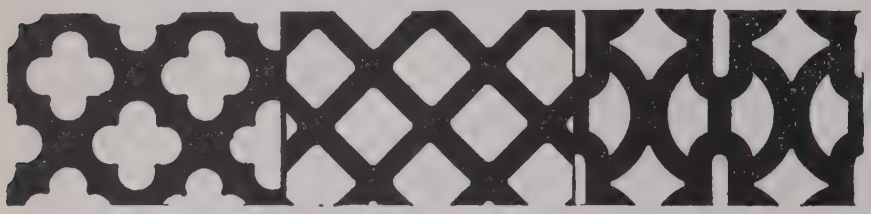
NEW YORK DETROIT DALLAS LOS ANGELES CLEVELAND



For whatever purpose you need perforated metal



Hendrick will fabricate it to your specifications * * * from any commercially rolled metal * * * in any gauge * * * with any shape or size of openings. Extensive plant facilities, an unsurpassed stock of dies and tools, and more than 70 years' experience in perforating metals, are at your service.

Write us regarding your specific requirements.

SEE OUR CATALOG IN SWEET'S

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Manufacturing Company

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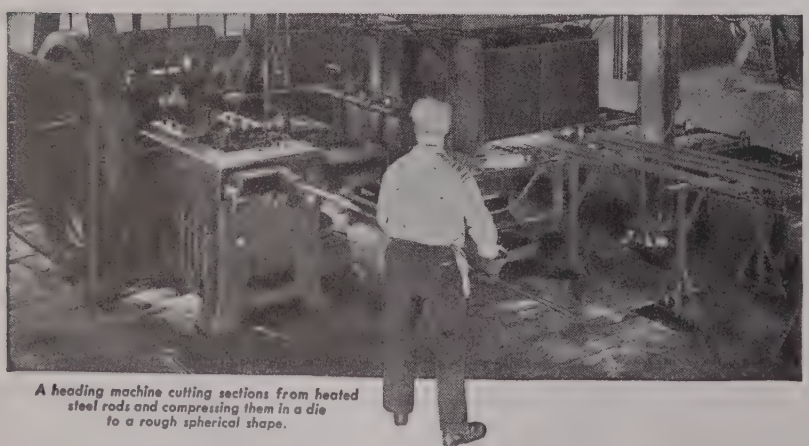
Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

This is how STROM BALLS are born



A heading machine cutting sections from heated steel rods and compressing them in a die to a rough spherical shape.

The steel is carefully chosen and inspected, even before it gets to the heading machine. After being "born" here, balls are carefully "brought up," through a long series of grinding and lapping operations, to the unbelievably high standards of finish, sphericity and precision which have made Strom Metal Balls the standard of Industry. Strom Steel Ball Co., 1850 South 54th Avenue, Cicero 50, Illinois.

Strom BALLS Serve Industry

Largest Independent and Exclusive Metal Ball Manufacturer

Francisco; four Copperweld Steel Co. plants at Warren, Ohio (333, 334, 383, and 1130); and three Willamette Iron & Steel Co. facilities at Portland (50, 772, 1956).

Alcoa plants at Riverbank, Calif., Newark, Ohio, Maspeth, N. Y. (226-A-1), Trentwood, Wash. (524 & 1061), McCook, Ill. (652), New Castle, Pa., and Kansas City, Mo.

Scullin Steel Co. (1672 & 299), St. Louis, Mo.; Atlantic Steel Casting Co., Crum Lynn, Pa.; Barium Stainless Steel Co., (709), Lorain, Ohio; Commercial Iron Works, Portland, Ore.

Crucible Steel Co., (466), Midland, Pa.; Republic Steel Corp., (1514), Warren, Ohio; and Youngstown Sheet & Tube Co., (328), Indiana Harbor.

Continental Foundry & Machine Co., (294), Coraopolis, Pa.; Howard Foundry Co., Chicago; Pittsburgh Steel Foundry Co., (659), Glassport, Pa.; Ohio Steel Foundry Co., (875), Lima, Ohio; and Hughes Tool Co., (143), Houston.

Revere Copper & Brass Co., (91), Chicago; National Smelting Co., Cleveland; Eagle Picher Mining & Smelting Co., (1023), Henryetta, Okla.; Domestic Manganese & Development Co., (1084), Butte, Mont.; and Hegeler Zinc Co., (971), Hegeler, Ill.

Tunnel Kilns Used To Make Sponge Iron

Washington

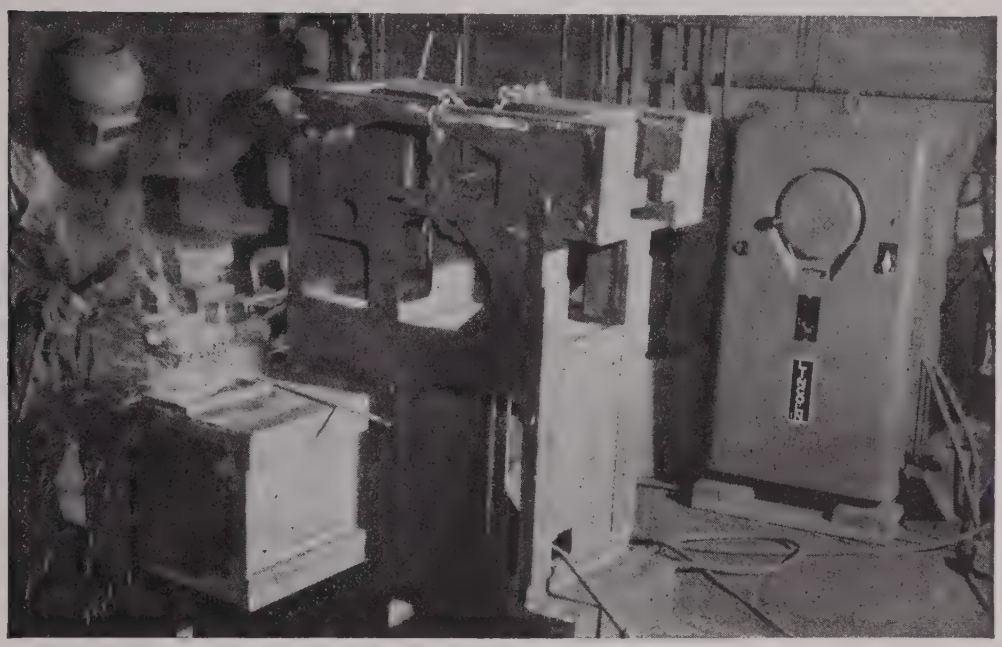
• • • **High-grade sponge** iron can be produced in large tunnel kilns similar to those used in modern ceramic plants for making refractory ware, according to a Bureau of Mines report.

On the basis of results of experiments at a commercial plant in Salisbury, N. C., the highest-grade sponge iron ever made by the Bureau was produced in a tunnel kiln and the product compared favorably with the long-established premium quality made in ceramic kilns in Hoeganease, Sweden. It is believed that production costs could be cut materially with better mechanization, such as multiple charging, and other developments in operational technique, the Bureau report states.

A free copy of the publication, Report of Investigations 4271, "Manufacture of Sponge Iron in Ceramic Tunnel Kilns," may be obtained by writing to the Bureau of Mines, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.

Arc Booster Makes AC Welding Easier

BY GEORGE G. LANDIS, ENGINEERING VICE PRESIDENT
THE LINCOLN ELECTRIC COMPANY, CLEVELAND, OHIO



Fabricating all-welded machine frame with 500 ampere "Fleetwelder."

ARC WELDING with AC welders has been greatly simplified by the Lincoln "Arc Booster." With this exclusive feature, arc striking becomes as simple as lighting a match.

Eliminates Electrode Sticking

The "Arc Booster" control is a simple device which gives the arc a momentary burst of welding current the instant the electrode touches the work, starting the arc automatically. In a fraction of a second after the arc is struck, the welding current returns to the amperage selected for the job.

Increases Safety

The "Fleetwelder" is safe to operate under all conditions. By making possible easy welding with open circuit voltages not exceeding 63 to 70 volts (depending upon the capacity of the welder), the "Arc Booster" eliminates the hazards of high open-circuit voltage or high frequency used in conventional welders to improve arc striking.

Improves Penetration

The instantaneous burst of welding current as the electrode touches the work causes the arc to "dig-into" the parent metal. This improves weld penetration at the start of the bead, particularly important for tack welding or for short beads.

"Arc Booster" Has Job Selector

Any one of six stages of booster current intensity is instantly available with a Job Selector switch, providing accurate control of booster current to suit each welding job. This Job Selector is of special value when changing from thin sheets to heavy plate.

Improves Arc Characteristics

The welder has a reactor type of control which is a free circuit, especially designed for high responsiveness to changing arc conditions. It is separate from the main transformer which is designed for high efficiency. This design gives high arc sensitivity and an exceptionally wide range of output for maximum ease and speed of welding under all conditions.

Reduces Idle Current Consumption

The independent control circuit eliminates the need for high open circuit voltage, contributes to higher power factor. By reducing amount of condensers needed as much as 66%, this new welder minimizes idle current input.

The above is published by LINCOLN ELECTRIC in the interests of progress. Write for free copy of Bulletin 366.
The Lincoln Electric Company, Dept. 66, Cleveland 1, Ohio.
Advertisement

ERIE SPECIAL BOLTING
FOR HEAVY MACHINERY

FOR over 30 years ERIE has specialized in the manufacture of *high quality bolting*. We use the very latest equipment for heat treating, machining, grinding and threading. We are certain that we can produce better bolting at a saving to you because we are specialists — send us your bolting specification for our estimate.

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A DEPENDABLE SOURCE OF HIGH QUALITY BOLTING FOR RAILROADS, REFINERIES, DIESELS, FARM MACHINERY, EXCAVATING EQUIPMENT AND ALL TYPES OF HEAVY MACHINERY.

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SUBSIDIARY OF BARIUM STEEL CORPORATION
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STUDS • BOLTS • NUTS ~ ~ ALLOYS • STAINLESS • CARBON • BRONZE

"Talk about refreshing—
Properly cooled water gets my vote!"

REFRIGERATION BY
Kelvinator
MADE BY
EBCO MANUFACTURING CO.
COLUMBUS, OHIO
U.S.A.

You make a strong bid for good will when you provide *properly cooled* drinking water where it's always convenient to everyone. *Cool* water *refreshes*. It makes people feel better. Increases accuracy. In fact, it's wise to *remind* people to refresh more often with *cool*, clear drinking water. Kelvinator-refrigerated Electric Water Coolers at strategic points throughout your plant, will do the trick with best results, at lowest cost. A size for every need.

Write for details.

The EBCO Manufacturing Co.
Town and Lucas Sts. Columbus 8, Ohio

The Standards Department

(Concluded from Page 83)

we have actually cut the variety in half on some large jobs. In terms of the assembly line, effort is exerted to keep the number of pans of nuts and screws to a minimum.

Reference is made to the similarity file to see whether any part already in production has been duplicated, or whether the design could be varied to accept a production part which is very similar although not an exact duplicate of the experimental part. The process specifications, of course, are examined in the same manner as the other details. This opportunity to see the whole picture cannot be had unless the standards department is geared right into the development process.

When all the recommendations are gathered, the engineer, the standards department and designer thrash out the whole project until agreement is reached, then the drawings and bill of material are changed accordingly. This is all done before an experimental model is made. Before standardization was coordinated with engineering and design that was not done. Models with unnecessary special items were made and tested, the design became frozen and it was too late to do much about it without incurring considerable expense.

In addition to being an integral part of the engineering operation, the standards department must be acquainted with the problems of production procurement, tooling, material control, cost estimating and inspection in order that the introduction of new standards or changes in old parts to conform to standard will not disrupt production too seriously. Close coordination with these non-engineering groups will act as a brake on possible over-enthusiastic introduction of changes which might create so much confusion that a great deal of their value will be lost and many people antagonized.

Can Reproduce German Nickel and Iron Alloy

Washington

• • • **Scientists at the** Naval Ordnance Laboratory, White Oak, Md., have reproduced for the first time in the United States a magnetic alloy (Permenorm 5000-Z) which will make possible important changes in the rectification of electric power, the Navy Dept. has announced.

GISHOLT TURRET LATHES

INSTANT SPEED CHANGES at the FLIP of a FINGER!

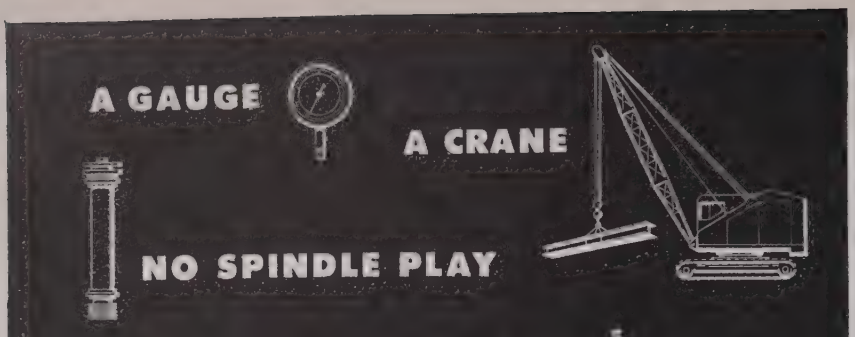
No manual gear shifting. Just touch this knob for quick high-low or low-high spindle speed shifts. A great timesaver — *Boosts Production!*

peed changes (6-1 ratio) are made by hydrauli-ally operated clutches. This standard feature on ll Gisholt Turret Lathes is a big advantage in rilling-tapping, boring-reaming, and turning-hreading operations.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

BALANCERS • SPECIAL MACHINES



A precision gauge can be only as accurate as the grinding machine used to finish-grind it. The sub-assemblies of a giant crane present an entirely different grinding problem. Whether in removing a few ten thousandths of metal in a high-accuracy operation, or in removing a lot of metal with greater allowable tolerances, freedom from spindle play is extremely important. That's just one of the reasons why you find Grand Rapids Grinders in so many leading plants of all types — from manufacturers of precision gauges to makers of huge cranes.

Other assurances of long-life accuracy and speed are: the fastest longitudinal table speed (125 f.p.m.) available in any grinder; vibrationless rigidity achieved by massive one-piece column and base casting; patented vertical head adjustment; Bijur one-shot lubricating system. *Accuracy within 0.00025 limits.

To serve you — *Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter Grinders, Hand Feed Surface Grinders, and Combination Tap and Drill Grinders.*

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Quick Solution to Your Material Handling Problems

Speedy Payloaders pay big dividends. They load, unload, carry and dump ore, sand, slag, coal, cinders, scrap, snow . . . haul, lift and push . . . indoors and outdoors. Hundreds of plants report remarkable records in labor, time and money saving — and increased production. Crane Hook and Bulldozer Blade attachments, interchangeable with the bucket, further increase Payloader usefulness.

Send for Complete Details

on the Model HA 10½ cu. ft. Payloader, the ¾ yd. Model HF or the 1¼ yd. Model HL.

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733 SUNNYSIDE AVE
TRACTOR SHOVELS
LIBERTYVILLE, ILL
SINCE 1920

NEWS OF INDUSTRY

Pressed Metal Men Of Toledo District Elect New Office

Toledo, Ohio

• • • **At a recent meeting** of t Toledo district of the Pressed Me Institute, Wilfred Williams, sa manager of the Acklin Stampi Co., was elected chairman of t Toledo district, replacing William Schomburg, president of the Sup ior Spinning and Stamping Co.

Other officers for the coming ye are as follows: Trustee-at-Lar William P. VonBehren, vice-pre dent of Swartzbaugh Mfg. C Toledo; First Vice-President, L. Schneider, president Toledo Stam ing and Mfg. Co.; Treasurer, Lo J. Schindler, vice-president Schi dler Stamping and Toy Co., Tole Secretary, Clyde Morrison, pre dent Metal Electric Processing C Toledo.

A resolution was passed by th in attendance, instructing t Toledo representatives to re-el Tom J. Smith, Jr., of Cleveland n tional president of the institute the National Trustees Meeti which is scheduled to be held A 21, at the Cleveland Hotel.

Trustees who will attend t Cleveland meeting are F. Cy Greenhill, member of the Natio Executive Committee; William VonBehren, and Wilfred Williams

Minor Changes On Tin And Can Orders Are O

Washington

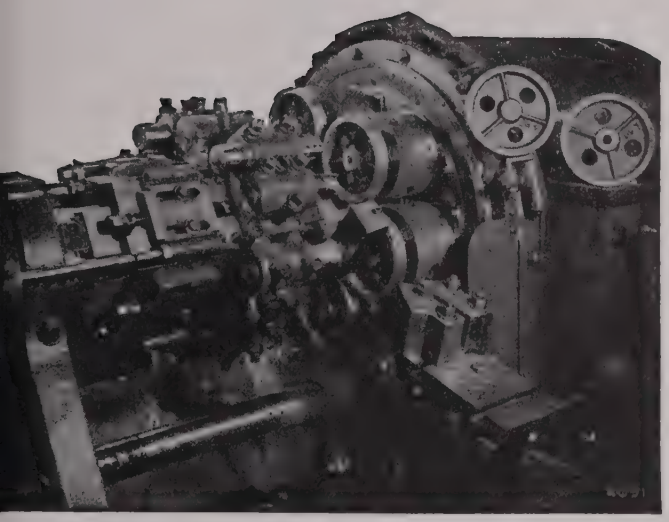
• • • **Minor changes in** Conser tion Orders M-43 (tin) and M (cans) have been announced by t Office of Domestic Commerce, De of Commerce.

Principal changes in M-43 clude (1) tightening of the delive use and small order provisions; introduction of a simplified sta ard customer's certificate; (3) clusion of specifications to gu tinplate manufacturers in check tin coatings to determine confor ity with restrictions; (4) revision import-export provisions to co all forms of tin; (5) establishm of tin-coating specifications general-purpose export crow which correspond with those domestic-use crowns. Both ty now are restricted to .25-lb coating.

The amendment of M-81 incor rates measures to conserve tin the manufacture of cans.

FOR HIGH PRODUCTION OF WORK REQUIRING FINE FINISHED SURFACES AND TO CLOSE LIMITS.

BAIRD No. 76H CHUCKER



Here is shown a "Baird" #76H Chucking Machine, set up for turning, facing and boring gear Blanks made of a Special Cast Iron having a Rockwell hardness—85-90 B Scale.

The O.D. is finished turned to 6.800 plus or minus .001 and both faces are finished to 1.000 width, plus or minus .001.

The Hole is finished bored and reamed .750 diameter to plug gage and is concentric with the O.D. turning within .001 total indicator reading.

The work is held in Standard "Baird" Three Jaw Contracting Chucks, using stud type jaws for gripping. (The Spindle Turret is shown partially indexed to better illustrate the method of chucking.)

This gear is completely turned as shown to the required accuracy at the rate of 55 pieces per hour.

Some of the exclusive features which have made this "Baird" 7" six spindle horizontal indexing lathe outstanding are:

INDEPENDENT TOOL SLIDES. The longitudinal tool slides may have different strokes and the cross slides are independent and have their strokes, all as best suits the job. All tool slides have micrometer adjustment.

DIFFERENT SPEEDS AT SPINDLES. Ability to choose a speed for the spindle at each work station to suit the operation to be performed at that station permits of best product in least time.

AUTOMATIC CHUCKING. Operator has both hands free to handle the work. No levers or handles to require his attention or take his time.

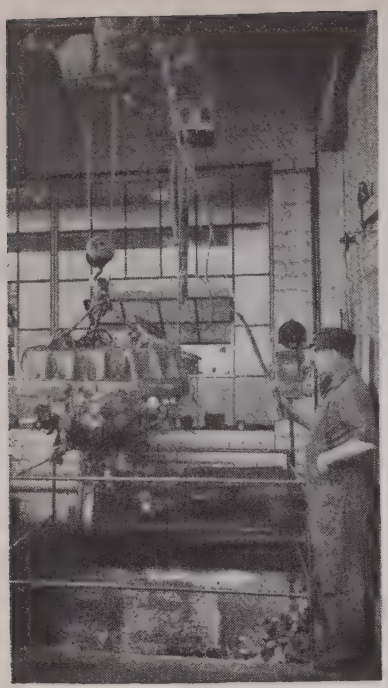
ATTACHMENTS. Several readily applied attachments are available to perform extra operations and reduce handling, thus speeding production.

AUTOMATIC MECHANICAL STOP. This stops the machine at the end of each cycle if operator has not unloaded and reloaded in the proper operation of machine. This and other safety features make for least loss due to damage and for greatest safety.

When you have Turning Operations that should be done profitably

"Ask **BAIRD** *About It"*

THE BAIRD MACHINE COMPANY, STRATFORD 9, CONN.



MATERIAL MOVES FAST WITH STEARNS Lifting MAGNETS

Monarch Machine Tool Co. gets fast handling of chips and shavings from briquetting machine to bins or truck with a Stearns Lifting Magnet.

Only one of many jobs efficiently and economically done by Stearns Magnets. You may have a similar problem in which we can be of definitely profitable assistance.

For moving material quickly at low cost, saving hand labor on difficult and dangerous operations, increasing storage capacities—install a dependable, sturdy Stearns Magnet.

Write for our Bulletin 35.

STEARNS MAGNETIC MFG. CO.

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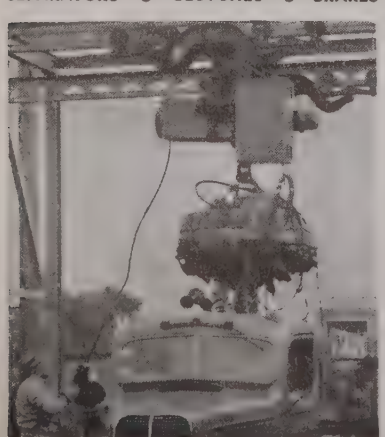

Peacetime Military Service Policies Are Surveyed In Industry

New York

• • • **Definite military** leave policies have been adopted in more than 85 pct of nearly a thousand companies surveyed by the National Industrial Conference Board. No policy has been determined in many of the remaining companies because "none" or only a "few" of their employees are members of the National Guard or a Reserve unit of the Army, Navy, Marines, or Air Forces.

The Board surveyed the military leave policies for salaried employees in 466 companies, and for hourly workers in 455 other companies.

Military Leave for Salaried Employees

Of the 380 companies that have formulated definite military leave policies for salaried employees, about half permit time off for military training in addition to regular scheduled vacations.

Military Leave for Wage-Earners

In the 407 companies where military leave policies exist for hourly workers, the great majority do not grant leaves of absence in addition to the vacation allowance.

Size of Company as a Factor

Most of the cooperators that do not grant extra time off for military training are small companies. For example, among the 106 companies with fewer than 250 employees, only nine grant time off to hourly workers. But twenty-six of the thirty-two companies with more than 5,000 employees grant additional time off to hourly workers for military training.

Length of Leave Granted

This survey reveals that the length of military leaves varies from one week to one month. Among the cooperating companies, the two most prevalent leaves of absence periods are two weeks and fifteen days. Some companies have set no maximum leave time and indicate that leave is granted for "the time required."

Compensation Practices—Salaried Employees

Of the companies having a pay policy for salaried employees in the National Guard, about a third make up the difference between the governmental compensation (if less) and the employee's regular salary.

Compensation Practices — Hourly Workers

In the cooperating companies having a pay policy for hourly

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ALLOY BARS

ROUNDS
SQUARES
HEXAGONS

Hot Rolled.
½" to 10" Rd.

Cold Drawn.
⅛" to 4½" Rd.
3/16" to 2" Sq.

⅜" to 2½" Hex.

AIRCRAFT

AMS—6260
6270
6272
6280
6322
6324
6415
6320 Hex.

BESSEMER

B1113

CARBON

1045 H.R.

FORGINGS

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CHICAGO 2, ILL.
RAN 5253

STABILIZED ZIRCONIA

Unusually High
Melting Point (2600° C)

Excellent Heat
Shock Resistance

Possessing chemical stability, hardness and resistance to chemical attack, stabilized zirconia is even more exceptional because of its excellent resistance to thermal shock. These properties make stabilized zirconia crucibles ideally suited to the melting of precious metals such as platinum and high melting point super-alloys. They offer excellent possibilities in other applications. More detailed information may be secured from TAM research and engineering staffs or by writing direct.

COMPARATIVE CHARTS POINT UP ADVANTAGES

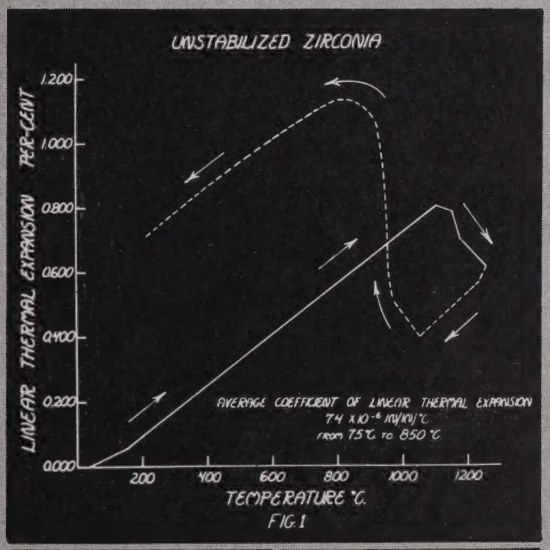


FIG. 1

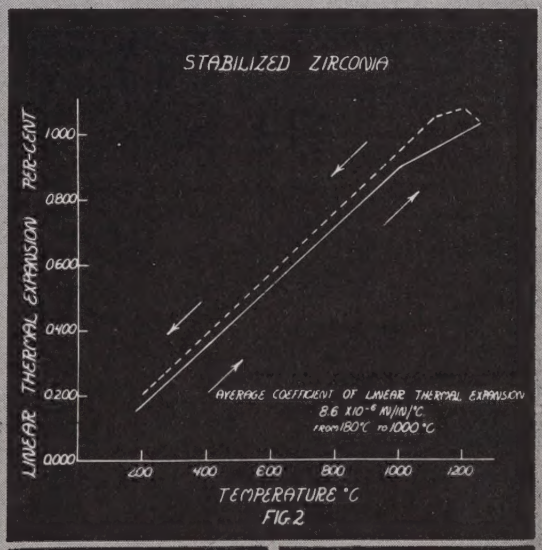
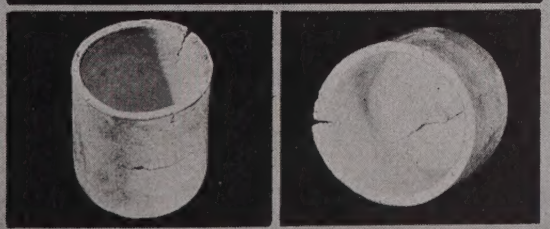
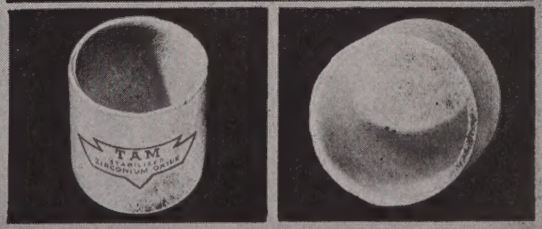


FIG. 2



Unstabilized crucible cracked badly after one cycle of air quenching from 15 minutes at 2800° F.



Crucible of stabilized zirconia did not fail after more than 20 such cycles.

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workers in the National Guar about 40% make up the differen between the workers' active du training pay and his normal co pany earnings. Over half gra time off for training but give company pay to the worker wh he is training. A few compani grant full company earnings wh the worker is on leave or else r port special compensation plans f hourly workers in the Nation Guard.

Supply of Top-Grade Steel Is Threatened Chemists Are To

Moraine City, Ohio

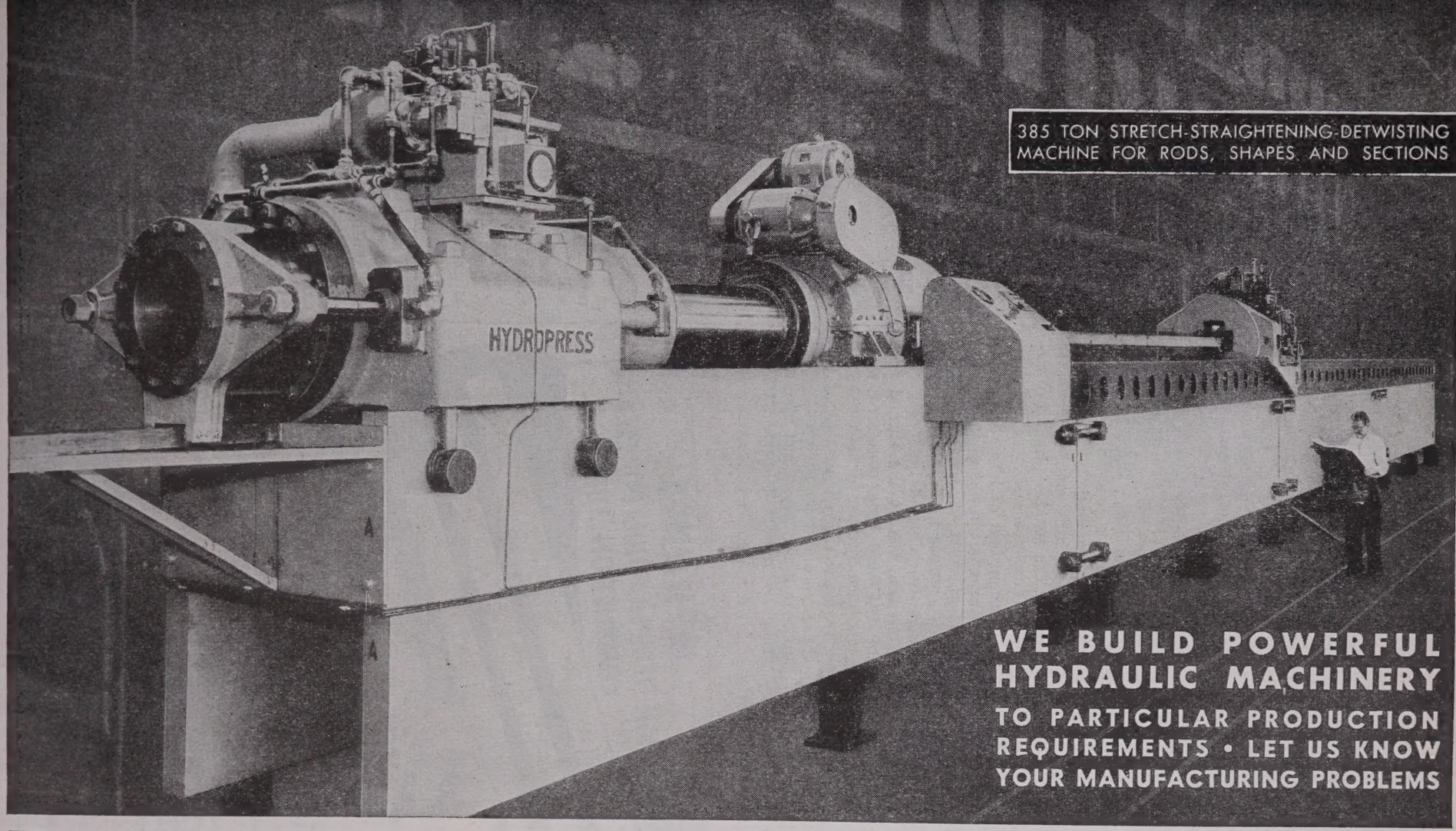
• • • **A continuing flow** of hi quality steel products made fr sheet metal can be assured only intensive research, Harold P. G of Armco Steel Corp., Middleto Ohio, declared at a meeting of t Dayton section of the Americ Chemical Society.

Steel producers employing t widely used openhearth refini process must contend with incre ing amounts of sulfur in their r materials, according to Mr. Ga who explained that a sulfur co tent of more than about one-f tieth of 1 pct makes steel too ha and brittle to be easily drawn.

"Despite the fact that the ope hearth process has been in use sin 1860, chemists and metallurgi still do not fully understand h sulfur is removed from the molt metal, Mr. Gaw stated. The hi temperature of 3,000° is in its a barrier to detailed chemic studies, he noted, and this accou for the "rather meager informati available on the sulfur reaction

Chemical and metallurgical r search and the experience of oper tors have shown that a number factors stimulant efficient remov of sulfur from the metal, Mr. Ga said, citing high alkalinity of t slag, low iron oxide and high ma ganese oxide content, fluidity the slag, quantity of slag, fast me ing, and a low total input of sulf

"The problem of sulfur remov is likely to become greater becau of a trend toward increasing sulf input from raw materials, as w as fuels," he asserted. "Further i tensive study of the fundament of sulfur removal are necessary order to obtain still further know edge, and to be able to do the j confronting openhearth operator



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British Outlook Dim Regarding Additional Imported Scrap, Coke

London

• • • **Unless supplies** of coke and imported scrap can be raised quickly, there will be the greatest difficulty in maintaining steel production at the high rate which has so far been justified by the success of the home scrap drive, according to the British Iron and Steel Federation.

The situation regarding German scrap is regarded as particularly unfortunate, as supplies of commercial scrap coming forward out of an aggregate of about 10,000,000 tons which a recent American report has stated is available in Germany are almost negligible; and, even in the future, they seem likely to amount to no more than 5,000 tons a week at best.

Yet at the very time when the authorities are apparently finding it impracticable to arrange for bigger deliveries of this type of scrap from Germany, facilities are being offered by the Joint Economic Control Commission for the purchase in dollars of substantial tonnages of imported ore for use in Germany. The figure for this year has been fixed at 1,500,000 tons, mainly from Sweden.

This claim on imported ores by Germany introduces a new element of competition for the limited supply of rich ore at present available. At the very time, therefore, when there is a serious shortfall below the planned export of German scrap, which is embarrassing steel production in Britain and leading to stock depletion, there is an increased claim on imported ore which is making it difficult to reach, and still more difficult to exceed, the British target for imported supplies.

Consumption of imported ore in the first quarter was at the annual rate of 8,845,000 tons, compared with 9,040,000 forecast in the Economic Survey and home ore consumption was at the annual rate of 11,959,000 tons, compared with 13,470,000 forecast in the survey.

Owing to the richer nature of imported ore and the lower quantities of coke it requires, it has been particularly important to use to the full the available supplies of imported ore at a time when coke supplies have been below allocations. With an increase in coke supplies home ore consumption would rise. It is the improved supply of home-bought scrap which is primarily responsible for the high level of steel production, and not the reduction in stocks to which the Chancellor has frequently made reference. That stocks of scrap and pig-iron declined was due to Government failure to implement the program for imported scrap and coke supplies, says the Federation.

Notwithstanding the shortfall in these two items, production has been carried forward to record levels on the assumption that the plans under those heads would eventually be carried out, and the deficiency for the time being has been made good out of stock.

The total reduction of 115,000 tons of scrap and pig-iron in the quarter was more than accounted for by the shortfall in imported scrap of nearly 400,000 tons below the annual rate planned and a fall of coke deliveries of about 200,000 tons a year below the allocated rate.

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Operator Cockpits, Wire Recordings in New Lift

Boston

• • • **Customers in** Jordan Marsh new department store in Boston will ride on elevators equipped with private "cockpits" for the operator and with loudspeakers to broadcast wire-recorded floor announcements.

This was revealed by Edward F. Mitton, president of the store, as he announced details of a $310,000 contract awarded to the Westinghouse Elevator Division for the construction of seven new elevators in the initial Chauncy St. section of the projected 14-story building.

Operators of the passenger elevators will stand in a private compartment on the right-hand wall of the car, with its floor 1 ft above the passenger level. Since the space behind the operator's "cockpit" will be closed off, passengers will be able to move directly forward when getting off, instead of having to work their way out from behind the operator.

Customary announcements at each floor will be replaced by brief wire-recordings which will play through loudspeakers in each car.